
This is a reproduction of a library book that was digitized by Google as part of an ongoing effort to preserve the information in books and make it universally accessible.

GoogleTM books

<https://books.google.com>



AFRICA PILOT.
PART II.
NORTH ATLANTIC ISLANDS
&
CAPE SPARTEL TO RIVER CAMEROON
SIXTH EDITION
1899.

VK
798
G7

Hyd. Brit. Hydrographic Dept

AFRICA PILOT.

PART I.

OR

SAILING DIRECTIONS

FOR THE

WEST COAST OF AFRICA,

FROM CAPE SPARTEL TO THE RIVER CAMEROON,

ALSO

THE AZORES, MADEIRA, CANARY, & CAPE VERDE ISLANDS.



SIXTH EDITION.

1899.

PUBLISHED BY ORDER OF THE LORDS COMMISSIONERS OF THE ADMIRALTY.

LONDON:

PRINTED FOR THE HYDROGRAPHIC OFFICE, ADMIRALTY,

AND SOLD BY

J. D. POTTER, AGENT FOR THE SALE OF ADMIRALTY CHARTS,

31, POULTRY, AND 11, KING STREET, TOWER HILL.

1899.

Price Four Shillings.

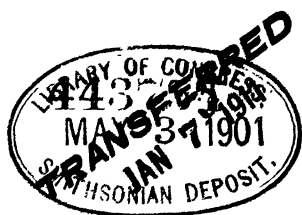
S. D. 02

*Dup. U. of C,
L B.*

I

W

By ~~W. H. H. H.~~
JUN 22 1914



ADVERTISEMENT

TO

SIXTH EDITION.

AFRICA PILOT, Part I., contains Sailing Directions for the West Coast of Africa, from cape Spartel to the river Cameroon, also for the Azores, Madeira, Canary, and Cape Verde islands.

These directions were originally compiled by Staff-Commander J. Burdwood, R.N., of the Hydrographic Department, in 1855, from the remarks and sailing directions furnished by Captain Vidal; Commanders Boteler, Belcher, Denham, and Allen; and Lieutenants Arlett and Owen of the Royal Navy: the several Admiralty surveys executed between 1821 and 1846 having been conducted by those officers: and Lieutenant A. M. Field, R.N., in 1881-82. The official information received from Foreign Governments and British Consular Reports have further been consulted, as also the Remark Books of officers of Her Majesty's ships and trustworthy information from Mercantile establishments and officers in the Mercantile Marine to 1899.

In the second edition, prepared by Staff-Commander D. Pender, R.N., of the Hydrographic Department, the description of the Azores, Madeira, Canary, and Cape Verde islands was added and the results of the surveys made by Captain J. Glover, R.N., in 1870.

The third edition was prepared by Staff-Commander W. R. Martin, of the Hydrographic Department, in 1880. The fourth edition, which included the result of the surveys of Lieutenant A. M. Field, R.N., in 1881-2, was published in 1885.

The fifth edition was prepared by Captain G. H. Inskip, R.N., and published in 1890.

In this, the sixth edition, new directions for the coast between Sierra Leone and the Sherbro river, derived from the surveys of Commander G. E. Richards, H.M. Surveying Vessel *Rambler*, 1895, have been added. Considerable additional information concerning the river Niger and the creeks of the Niger delta has been furnished by Lieutenant-Commander G. C. A. Marescaux, H.M.S. *Alecto*, and other officers employed in H.M. ships on the west coast of Africa station, also by the Right Honourable Sir George T. Goldie, K.C.M.G., Sir Claude M. MacDonald, K.C.B., K.C.M.G., and Captain A. F. Mockler-Ferryman, F.R.G.S.

The work has been prepared for the press by Staff-Commander J. R. H. MacFarlane, R.N.

Officers of the Royal Navy and Mercantile Marine are requested to transmit to the Secretary of the Admiralty notice of any errors or omissions they may discover in this work.

By the publication of this work all Hydrographic Notices relating to former editions and all Notices to Mariners, including No. 659 of 1899, are cancelled.

W. J. L. W.

HYDROGRAPHIC OFFICE,
ADMIRALTY, LONDON.

November 1899.

CONTENTS.

CHAPTER I.

General remarks. Rivers. Flora and fauna. Populations. Products.	Page
Ports. Trade. Communications. Climates. Winds and weather. Currents. Coal. Passages	1-63

CHAPTER II.

Azores or Western islands	64-102
---------------------------	--------

CHAPTER III.

Cape Spartel to cape Bojador	103-136
------------------------------	---------

CHAPTER IV.

Madeira group and Salvage islands	137-159
-----------------------------------	---------

CHAPTER V.

Canary islands	160-191
----------------	---------

CHAPTER VI.

Cape Bojador to river Gambia	192-226
------------------------------	---------

CHAPTER VII.

Cape Verde islands	227-250
--------------------	---------

CHAPTER VIII.

River Gambia to Isles do Los	251-306
------------------------------	---------

CHAPTER IX.		Page
Isles do Los to shoals of St. Ann	- - - -	- 307-388
<hr/>		
CHAPTER X.		
Shoals of St. Ann to cape Palmas; Liberia or Grain coast	- - -	- 389-368
<hr/>		
CHAPTER XI.		
Cape Palmas to cape Three Points; Ivory coast	- - -	- 369-392
<hr/>		
CHAPTER XII.		
Cape Three Points to cape St. Paul; Gold coast	- - -	- 393-422
<hr/>		
CHAPTER XIII.		
Cape St. Paul to cape Formosa; Bight of Benin	- - -	- 423-490
<hr/>		
CHAPTER XIV.		
Cape Formosa to river Cameroon; Bight of Biafra	- - -	- 491-586
<hr/>		
APPENDIX.		
Meteorological tables	- - - - -	- 537-547
<hr/>		

SYSTEM OF ORTHOGRAPHY.

Adopted by the Admiralty for Sailing Directions and Charts.

As far as has been found possible with existing knowledge, native names are spelt in accordance with the following system, which has been adopted by the principal authorities in Great Britain and by the United States, and has been for some years in process of gradual introduction into all Admiralty Sailing Directions and Charts.

1. Where native names have been so long written in a form, which, though not in accordance with this system, has become familiar to English eyes from being so spelt in all charts and maps, they are retained, and all European names are retained as spelt originally.
2. The true sound of the word as locally pronounced is taken as the basis of the spelling.
3. An approximation of the sound is alone aimed at. A system which would attempt to represent the more delicate inflections of sound and accent would be so complicated as only to defeat itself.
4. The broad features of the system adopted are that vowels are pronounced as in Italian and consonants as in English; *every letter being pronounced*. One accent only is used, the acute, to denote the syllable on which stress is laid. This is very important, as the sounds of many names are entirely altered by the misplacement of this "stress."
5. When two vowels come together, each one is sounded, though the result, when spoken quickly, is sometimes scarcely to be distinguished from a single sound, as in *ai, au, ei*.

The amplification of the rules is given on the following pages.

Information is invited as to the proper spelling of native names, so as to produce the nearest approximation to the true sound, by this system.

Letters.	Pronunciation and Remarks.	Examples.
a	<i>ah</i> , <i>a</i> as in <i>father</i> - - - -	Java, Banána, Somáli, Bari.
e	<i>eh</i> , <i>e</i> as in <i>benefit</i> ; <i>a</i> as in <i>fate</i> - -	Tel-el-Kebír, Oléleh, Yezo, Levúka, Peru.
i	English <i>e</i> ; <i>i</i> as in <i>ravine</i> ; the sound of <i>ee</i> in <i>beet</i> . Thus, not <i>Feejee</i> , but	Fiji, Hindi.
o	<i>o</i> as in <i>mole</i> - - - -	Tokyo.
u	long <i>u</i> as in <i>flute</i> ; the sound of <i>oo</i> in <i>boot</i> . <i>oo</i> or <i>ou</i> should never be employed for this sound. Thus, not <i>Zooloo</i> or <i>Zoulou</i> , but The shorter sound of the different vowels, when necessary to be indicated, can be expressed by doubling the consonant that follows. The sounds referred to are as follows:— The short <i>a</i> as in <i>fatter</i> compared with the long <i>a</i> as in <i>father</i> ; the short <i>e</i> as in <i>better</i> compared with the long <i>e</i> as in <i>fate</i> ; the short <i>i</i> as in <i>sinner</i> compared with the long <i>i</i> as in <i>ravine</i> ; the short <i>o</i> as in <i>sobbing</i> compared with the long <i>o</i> as in <i>sober</i> ; the short <i>u</i> as in <i>rubber</i> compared with the long <i>u</i> as in <i>rubric</i> . In the case of two different consonants following a short <i>u</i> , the accent <i>ü</i> may be used instead of doubling the consonant, as <i>Tüng</i> , pronounced <i>Tongue</i> . Doubling of a vowel is only necessary where there is a distinct repetition of the single sound.	Zulu, Sumatra. Yarra, Tanna, Mecca, Jidda, Bonny.*
ai	as in <i>aisle</i> or English <i>i</i> as in <i>ice</i> - -	Shanghai.
au	<i>ow</i> as in <i>how</i> . Thus, not <i>Koochow</i> , but	Fuchau.
ao	is slightly different from <i>au</i> - - -	Macao.
aw	when followed by a consonant or at the end of a word as in <i>law</i> .	Cawnpore.
ei	is the sound of the two Italian vowels, but is frequently slurred over, when it is scarcely to be distinguished from <i>ey</i> in the English <i>they</i> , or <i>ei</i> in <i>eight</i> .	Beirút, Beilul.
b	English <i>b</i> .	
c	is always soft, but is so nearly the sound of <i>s</i> that it should be seldom used. If <i>Celébes</i> were not already recognised it would be written <i>Selébes</i> .	Celébes.
ch	is always soft as in <i>church</i> - - -	Chingchin.
d	English <i>d</i> .	
f	English <i>f</i> . <i>Ph</i> should not be used for the sound of <i>f</i> . Thus, not <i>Haiphong</i> , but	Haifong, Nafa.
g	is always hard. (Soft <i>g</i> is given by <i>j</i>) -	Galápagos.
h	is always pronounced when used.	

* The *y* is retained as a terminal in this word under rule 1. The word is given as a familiar example of the alteration in sound caused by the second consonant.

Letters.	Pronunciation and Remarks.	Examples.
hw	as in <i>what</i> ; better rendered by <i>hw</i> than <i>wh</i> , or <i>h</i> followed by a vowel. Thus, <i>Hwang ho</i> , not <i>Whang ho</i> or <i>Hoang ho</i> .	Ihwang ho, Ngan hwi.
j	English <i>j</i> . <i>Dj</i> should never be put for this sound.	Japan, Jinchuen.
k	English <i>k</i> . It should always be put for the hard <i>c</i> . Thus, not <i>Corea</i> , but	Korea.
kh	The Oriental guttural	Khan.
gh	is another guttural, as in the Turkish	Dagh, Ghazi.
l	} As in English.	
m		
n		
ng		
	has two separate sounds, the one hard as in the English word <i>finger</i> , the other as in <i>singer</i> . As these two sounds are rarely employed in the same locality, no attempt is made to distinguish between them.	
p	As in English.	
ph	As in <i>loophole</i>	Mokpho, Chemulpho.
th	Stands both for its sound in <i>thing</i> , and as in <i>this</i> . The former is most common	Bethlehem.
q	should never be employed; the sound of <i>qu</i> in <i>quiver</i> is given as <i>hw</i> . When <i>qu</i> has the sound of <i>k</i> , as in <i>quoit</i> , it should be given by <i>k</i> .	Kwangtung.
r	As in English.	
s	As in <i>sin</i> .	
sh	} As in English.	
t		
v		
w		
x	- - - - -	Sawákin.
y	is always a consonant, as in <i>yard</i> , and therefore should never be used as a terminal, <i>i</i> or <i>e</i> being substituted, as the sound may require.	Kikūyu.
	Thus, not <i>Mikindány</i> or <i>Wady</i> , but not <i>Kwaly</i> , but	Mikindáni, Wadi.
z	English <i>z</i>	Kwale.
zh	French <i>j</i> , or as <i>s</i> in <i>treasure</i>	Zulu.
	Accents should not generally be used, but where there is a very decided emphatic syllable or stress which affects the sound of the word, it should be marked by an <i>acute</i> accent.	Muzhdaha.
		Tongatábu, Galápagos, Paláwan, Saráwak.

INFORMATION RELATING TO CHARTS, SAILING DIRECTIONS, AND THE GENERAL NAVIGATION OF H.M. SHIPS.

ON THE CORRECTION OF CHARTS, LIGHT LISTS, AND SAILING DIRECTIONS.

There are three descriptions of publications as guides to navigation—the Charts, the Sailing Directions, and the Light Lists—which are all affected by the continual changes and alterations that take place.

Of these the charts should always be, so far as our knowledge permits, absolutely correct to date ; and the light lists should be noted for the recent alterations, though space will not permit of full details being always inserted ; the sailing directions, however, cannot, from their nature, be so corrected, and *in all cases where they differ from charts, the charts must be taken as the guide.*

1. Charts.—When issued to a ship on commissioning, the charts have received all necessary corrections to date. As sent from the Hydrographic Office they are, as a rule, fresh from the plates. They then receive such corrections by hand in the dépôts as are required, and are so issued to the ships.

All small but important corrections that can be made by hand are notified by Notices to Mariners, and should at once be placed on the charts to which they refer.

Large corrections that cannot conveniently be thus made are put upon the plates, and fresh copies are issued to the ships to replace the others, which are directed to be destroyed to prevent the possibility of their being used in the navigation of the ship.

The dates on which these large corrections are made are noted on the chart plates in the middle of the lower edge; those of the smaller corrections at the left-hand lower corners.

In all cases of quotations of charts, these dates of corrections should be given as well as the number of the chart (which will be found in the lower right-hand corner), in order that at the Admiralty it may be known what edition of the chart is referred to.

2. *The Light Lists*, annually published at the beginning of each year, are not corrected in the dépôts before issue, but appendices are issued every two months, giving the alterations that have taken place, copies of which are put into the chart boxes.

It is the duty of the navigating officer when he receives the set of charts to make notations in the light lists from these appendices, and from the Notices to Mariners in the box; and to keep them so corrected from time to time.

The Light Lists should always be consulted as to the details of a light, as the descriptions in the Sailing Directions may be obsolete, in consequence of changes made since publication.

3. *The Sailing Directions* are not corrected before issue, except occasionally for very important new rocks or dangers. Hydrographic Notices and Supplements referring to each volume are published from time to time.

Supplements contain all the information received up to date since the publication of the volume to which they refer, and cancel all previous Hydrographic Notices.

Hydrographic Notices contain all information up to date since the publication of the volume, or since the last Supplement or Hydrographic Notice, but endeavour is made to issue no more than one of these affecting each volume, and, on the collection of fresh information, to include the former Notice in a Supplement.

The existence of Supplements or Hydrographic Notices is to be noted, in the tabulated form placed for the purpose inside the cover of each volume, in cases when such notations have not been made before issue, and also on receipt of further Notices after commission.

Notes should be made in the margin of the volume of sailing directions affected, as references to the Supplements or Hydrographic Notices when the latter are printed on both sides.

To enable the books to be more conveniently corrected, however, such Supplements and Hydrographic Notices as are of moderate size are now being printed on one side only, and two copies are issued to each ship; one to cut up, the slips being pasted in at the appropriate place; the other to remain intact for reference.

To make these notations or paste in these slips is one of the early duties of a navigating officer after drawing his box of charts and books, and similar notes are to be made from Notices to Mariners that may thereafter be received.

It must, however, be thoroughly understood that sailing directions will never be correct in all details, except up to the date of the last Hydrographic Notice or Supplement, and that, as already stated, when differences exist, the chart, which should be corrected from the most recent information, should be taken as the guide; for which purpose, for ordinary navigation, they are sufficient.

THE USE OF CHARTS AS NAVIGATIONAL AIDS, AND GENERAL REMARKS RELATING TO PRACTICAL NAVIGATION.

1. Accuracy of a Chart.—The value of a chart must manifestly depend upon the accuracy of the survey on which it is based, and this becomes more important the larger is the scale of the chart.

To estimate this, the date of the survey, which is always given in the title, is a good guide. Besides the changes that, in waters where sand or mud prevails, may have taken place since the date of the survey, the earlier surveys were mostly made under circumstances that precluded great accuracy of detail, and until a plan founded on such a survey is tested, it should be regarded with caution. It may, indeed, be said that, except in well-frequented harbours and their approaches, no surveys yet made have been so minute in their examination of the bottom as to make it certain that all dangers have been found. The fulness or scantiness of the soundings is another method of estimating the completeness of a chart. When the soundings are sparse or unevenly distributed, it may be taken for granted that the survey was not in great detail.

Blank spaces among soundings mean that no soundings have been obtained in these spots. When the surrounding soundings are deep it may with fairness be assumed that in the blanks the water is also deep; but when they are shallow, or it can be seen from the rest of the chart that reefs or banks are present, such blanks should be regarded with suspicion. This is especially the case in coral regions and off rocky coasts, and it should be remembered that in waters where rocks abound it is always possible that a survey, however complete and detailed, may have failed to find every small patch.

A wide berth should therefore be given to every rocky shore or patch, **and this rule should be invariably followed, viz., that instead of considering a coast to be clear unless it is shown to be foul, the contrary should be assumed.**

2. *Fathom Lines a Caution.*—Except in plans of harbours that have been surveyed in detail, the five-fathom line on most Admiralty charts is to be considered as a caution or danger line against unnecessarily approaching the shore or bank within that line, on account of the possibility of the existence of undiscovered inequalities of the bottom, which nothing but an elaborate detailed survey could reveal. In general surveys of coasts or of little frequented anchorages, the necessities of navigation do not demand the great expenditure of time required for such a detailed survey. It is not contemplated that ships will approach the shores in such localities without taking special precautions.

The ten-fathom line is, on rocky shores, another warning, especially for ships of heavy draught.

Charts where no fathom lines are marked must be especially regarded with caution, as it generally means that soundings were too scanty and the bottom too uneven to enable them to be drawn with accuracy.

Isolated soundings, shoaler than surrounding depths, should always be avoided, especially if ringed round, as there is no knowing how closely the spot may have been examined.

3. *Chart on largest scale always to be used.*—It sometimes happens that, from press of work, only the copper plate of the larger scale chart of a particular locality can at once receive any extensive rearrangement of coast-line or soundings. This is an additional reason, besides the obvious one of the greater detail shown on a larger scale chart, why this largest scale chart should always be used for navigating.

4. *Caution in using small Scale Charts.*—In approaching the land or dangerous banks, regard must always be had to the scale of the chart used. A small error in laying down a position means only yards on a large scale chart, whereas on a small scale the same amount of displacement means large fractions of a mile. This is particularly to be observed when coming to an anchor on a narrow ledge of convenient depth at some distance from the shore.

For the same reason bearings to objects near should be used in preference to objects farther off, although the latter may be more prominent, as a small error in bearing or in laying it down on the chart has a greater effect in misplacing the position the longer the line to be drawn.

5. *Distortion of Printed Charts.*—The paper on which charts are printed has to be damped. On drying distortion takes place, from the inequalities in the paper, which greatly varies with different paper and the

amount of the original damping ; but it does not affect navigation. It must not, however, be expected that accurate series of angles taken to different points will always exactly agree, when carefully plotted upon the chart, especially if the lines to objects be long. The larger the chart the greater the amount of this distortion.

6. Buoys.—It is manifestly impossible that any reliance can be placed on buoys always maintaining their exact position. Buoys should therefore be regarded as warnings and not as infallible navigating marks, especially when in exposed positions ; and a ship should always, when possible, be navigated by bearings or angles of fixed objects on shore and not by buoys.

Gas Buoys.—The lights shown by gas buoys cannot be implicitly relied on, as, if occulting, the apparatus may get out of order or the light may be altogether extinguished.

7. Lights.—Circles drawn on charts round a light are not intended to give information as to the distance at which it can be seen, but solely indicate, in the case of lights which do not show equally in all directions, the bearings between which the variation, or visibility, or obscuration of the light occurs.

All the distances given in the Light Lists and on the charts for the visibility of lights are calculated for a height of an observer's eye of 15 feet. The table of distances visible due to height, at end of each Light List, affords a means of ascertaining how much more or less the light is visible should the height of the bridge be more or less. The glare of a powerful light is often seen far beyond the limit of visibility of the actual rays of the light, but this must not be confounded with the true range. Again, refraction may often cause a light to be seen farther than under ordinary circumstances.

When looking out for a light at night, the fact is often forgotten that from aloft the range of vision is much increased. By noting a star immediately over the light a very correct bearing may be afterwards obtained from the standard compass.

The intrinsic power of a light should always be considered when expecting to make it in thick weather. A weak light is easily obscured by haze, and no dependence can be placed on its being seen.

The power of a light can be estimated by remarking its order, as given in the Light Lists, and in some cases by noting how much its visibility in clear weather falls short of the range due to the height at which it is placed. Thus, a light standing 200 feet above the sea, and only recorded as visible at 10 miles in clear weather, is manifestly of little brilliancy, as its height would permit it to be seen over 20 miles if of any power. (See table in Light List above mentioned.)

8. *Fog Signals.*—Sound is conveyed in a very capricious way through the atmosphere. Apart from wind, large areas of silence have been found in different directions and at different distances from the origin of a sound, even in clear weather. Therefore too much confidence should not be felt in hearing a fog signal. The apparatus, moreover, for sounding the signal often requires some time before it is in readiness to act. A fog often creeps imperceptibly towards the land, and is not observed by the people at a lighthouse until it is upon them; whereas a ship may have been for many hours in it, and approaching the land. In such a case no signal may be sounded. When sound has to travel against the wind, it may be thrown upwards; in such a case, a man aloft might hear it when it is inaudible on deck.

Taken together, these facts should induce the utmost caution in closing the land in fogs. The lead is generally the only safe guide.

9. *Tides and Tidal Streams.*—In navigating coasts where the tidal range is considerable, caution is always necessary. It should be remembered that there are indraughts to all bays and bights, although the general run of the stream may be parallel to the shore.

The turn of the tidal stream off shore is seldom coincident with the time of high and low water on the shore. In open channels, the tidal stream ordinarily overruns the turn of the vertical movement of the tide by three hours, forming what is usually known as tide and half-tide, the effect of which is that at high and low water by the shore the stream is running at its greatest velocity.

In crossing a bar or shallow flats, the table (B) at page 98 of the Tide Tables will be found of great assistance in calculating how much the water has risen or fallen at any hour of the tide.

On coasts where there is much diurnal inequality in the tides, the amount of rise and fall can never be depended upon, and additional caution is necessary.

It should also be remembered that at times the tide falls below the level of low-water ordinary springs. This always occurs in temperate regions at the equinoxes, but wind may produce it at any time, and the amount varies with locality. When the moon's perigee coincides with the full or new moon the same effect is often produced.

10. *Current Arrows* on charts only show the most usual or the mean direction of a tidal stream or current. It must never be assumed that the direction of a stream will not vary from that indicated by the arrow. In the same manner, the rate of a stream constantly varies with circumstances, and the rate given on the chart is merely the mean of those found during the survey, possibly from very few observations.

11. *Fixing Position.*—The most accurate method of fixing a position relative to the shore is by angles between well-defined objects on the

chart. All ships are now being supplied with a station-pointer, and this method should be used whenever possible.

Two things are, however, necessary to its successful employment. First, that the objects be well chosen; and second, that the observer is skilful and rapid in his use of the sextant.

For the former, reference can be had to the pamphlet on the use of the station-pointer, which is in every chart box.

The latter is only to be obtained by practice.

It will readily be seen that in war time, when the compass may be knocked away, or rifle fire may make it undesirable to expose the person more than necessary, a sextant offers great advantages, as angles can be obtained from any position whence the objects are visible. It is this contingency that makes it especially desirable that all navigating officers should become expert in this method of fixing a ship's position.

In many narrow waters also, where the objects may yet be at some distance, as in coral harbours or narrow passages among mud banks, navigation by sextant and station-pointer is invaluable, as a true position can only be obtained by its means. A small error in either taking or plotting a bearing under such circumstances may put the ship ashore.

It is not intended that the use of the compass to fix the ship should be given up; there are many circumstances in which it may be usefully employed, but errors more readily creep into a position so fixed. In all cases where great accuracy of position is desired, angles should invariably be used, such as the fixing of a rock or shoal, or of additions to a chart, as fresh soundings or new buildings. In all such cases angles should be taken to several objects, the more the better; but five objects is a good number, as the four angles thus obtained not only prevent any errors, but they at once furnish a means of checking the accuracy of the chart itself. In the case of ordinary soundings, it is only necessary to take a third angle now and then; firstly, to check the general accuracy of the chart as above stated; secondly, to make certain that the more important soundings, as at the end of a line, are correctly placed.

Sometimes, when only two objects are visible, a compass bearing and sextant angle may be used with advantage.

In passing near a point of land, or an island, the method of fixing by doubling the angle on the bow is invaluable. The ordinary form of it, the so-called "four-point bearing," when the bearing is taken four points on the bow, and on the beam, the distance from the object at the latter position being the distance run between the times of taking the two bearings, gives an excellent fix for a departure, but does not ensure safety, as the point, and probably the rocks off it, are abeam before the position is obtained.

By taking the bearings of two points and four points on the bow, a very good position is obtained before the object is passed; the distance of the latter at the second position being, as before, equal to the distance run in the interval, allowing for current.

A table of factors, by which to multiply the distance run, to obtain the distance of the object when any number of degrees between the two bearings has been observed, is now supplied in all chart boxes.

The use of a danger angle in passing outlying rocks with land behind should also not be forgotten. In employing this method, however, caution is necessary, as should the chart be not accurate, *i.e.*, should the objects selected be not quite correctly placed, the angle taken off from it may not serve the purpose. It should not, therefore, be employed when the survey is old or manifestly imperfect.

In fixing by the compass, it must always be remembered that two bearings only are liable to error. An absolute error may be made in either bearing observed; errors may be made in applying the deviation; or errors may creep in in laying them on to the chart. For these reasons, a third or check bearing of some other object should be taken, especially when near the shore or dangers. The coincidence of these three lines will prevent any mistakes.

In ships still fitted with the Admiralty standard compass, the tripod supplied to hold the lamp will be found of great service in fixing position at night, as by its aid a bearing can be as accurately taken as in daylight. With Thomson's compass bearings can also be accurately observed at night. The utility of this in connection with ascertaining the change of bearing of an approaching ship's light should not be forgotten.

Amongst astronomical methods of fixing a ship's position, attention is drawn to the great utility of Sumner's method. A Sumner line, that is, a line drawn through the position (obtained by an assumed latitude and longitude by chronometer) at right angles to the bearing of the sun, as obtained from the azimuth tables, gives at times invaluable information, as the ship must be somewhere on that line provided the chronometer is correct. A deep cast at the same time may often serve to get an approximate position on the line. An early and very accurate position can be also obtained by Sumner's method, by getting longitude by a bright star at daylight when the horizon is well visible, and another longitude by the sun when a few degrees above the horizon, or by observing two or more stars at twilight. The Sumner lines drawn through the two positions thus obtained will, if the bearing of sun and star differ three points or more, give an excellent result.

12. *Change of Variation of the Compass.*—The gradual change in the variation must not be forgotten in laying down positions by bearing on charts. The magnetic compasses placed on the charts for the purpose of

facilitating plotting become in time slightly in error, and in some cases, such as with small scales, or when the lines are long, the displacement of position from neglect of this change may be of importance. The compasses are re-engraved when the error amounts to a quarter of a point, but the chart plates cannot be corrected more frequently from the impossibility of making alterations too often on one spot in a copper plate.

The geographical change in the variation is in some parts of the world sufficiently rapid to need consideration. For instance, in approaching Halifax from Newfoundland the variation changes 10° in less than 500 miles. The variation chart should be consulted on this head.

13. Local Magnetic Disturbance of the Compass on board Ship.—The term “local magnetic disturbance” has reference only to the effects on the compass of magnetic masses external to the ship in which it is placed. Observation shows that disturbance of the compass in a ship afloat is experienced only in a few places on the globe.

Magnetic laws do not permit of the supposition that it is the visible land which causes such disturbance, because the effect of a magnetic force diminishes in such rapid proportion as the distance from it increases that it would require a local centre of magnetic force of an amount absolutely unknown to affect a compass half a mile distant.

Such deflections of the compass are due to magnetic minerals in the bed of the sea under the ship, and when the water is shallow, and the force strong, the compass may be temporarily deflected when passing over such a spot, but the area of disturbance will be small, unless there are many centres near together.

The law which has hitherto been found to hold good as regards local magnetic disturbance is, that north of the magnetic equator the north end of the compass needle is attracted towards any centre of disturbance; south of the magnetic equator it is repelled.

It is very desirable that whenever a ship passes over an area of local magnetic disturbance, the position should be fixed, and the facts reported as far as they can be ascertained.

14. Use of Oil for Modifying the Effect of Breaking Waves.—Many experiences of late years have shown that the utility of oil for this purpose is undoubted, and the application simple.

The following may serve for the guidance of seamen, whose attention is called to the fact that a very small quantity of oil, skilfully applied, may prevent much damage both to ships (especially the smaller classes) and to boats, by modifying the action of breaking seas.

The principal facts as to the use of oil are as follows :—

1. On free waves, *i.e.*, waves in deep water, the effect is greatest.
2. In a surf, or waves breaking on a bar, where a mass of liquid is in actual motion in shallow water, the effect of the oil is uncertain; as nothing

can prevent the larger waves from breaking under such circumstances; but even here it is of some service.

3. The heaviest and thickest oils are most effectual. Refined kerosene is of little use; crude petroleum is serviceable when nothing else is obtainable; but all animal and vegetable oils, such as waste oil from the engines, have great effect.

4. A small quantity of oil suffices, if applied in such a manner as to spread to windward.

5. It is useful in a ship or boat, both when running, or lying to, or in wearing.

6. No experiences are related of its use when hoisting a boat up in a sea-way at sea, but it is highly probable that much time and injury to the boat would be saved by its application on such occasions.

7. In cold water, the oil, being thickened by the lower temperature, and not being able to spread freely, will have its effect much reduced. This will vary with the description of oil used.

8. The best method of application in a ship at sea appears to be: hanging over the side, in such a manner as to be in the water, small canvas bags, capable of holding from one to two gallons of oil, such bags being pricked with a sail needle to facilitate leakage of the oil.

The position of these bags should vary with the circumstances. Running before the wind they should be hung on either bow—*e.g.*, from the cathead—and allowed to tow in the water.

With the wind on the quarter the effect seems to be less than in any other position, as the oil goes astern while the waves come up on the quarter.

Lying to, the weather bow and another position farther aft seem the best places from which to hang the bags, with a sufficient length of line to permit them to draw to windward, while the ship drifts.

9. Crossing a bar with a flood tide, oil poured overboard and allowed to float in ahead of the boat which would follow with a bag towing astern, would appear to be the best plan. As before remarked, under these circumstances the effect cannot be so much trusted.

On a bar with the ebb tide it would seem to be useless to try oil for the purpose of entering.

10. For boarding a wreck, it is recommended to pour oil overboard to windward of her before going alongside. The effect in this case must greatly depend upon the set of the current, and the circumstances of the depth of water.

11. For a boat riding in bad weather from a sea anchor, it is recommended to fasten the bag to an endless line rove through a block on the sea anchor, by which means the oil is diffused well ahead of the boat, and the bag can be readily hauled on board for refilling if necessary.

**IN THIS WORK THE BEARINGS ARE ALL MAGNETIC
EXCEPT WHERE MARKED AS TRUE.**

**THE BEARINGS OF THE LIGHTS ARE FROM SEAWARD OR
TOWARDS THE LIGHTS.**

**THE DISTANCES ARE EXPRESSED IN SEA MILES OF
60 TO A DEGREE OF LATITUDE.**

**A CABLE'S LENGTH IS ASSUMED TO BE EQUAL TO
100 FATHOMS OR THE TENTH PART OF A MILE.**

**THE SOUNDINGS ARE REDUCED TO LOW WATER
OF ORDINARY SPRING TIDES.**

INDEX TO ADMIRALTY PUBLISHED CHARTS ALLUDED TO IN THIS WORK

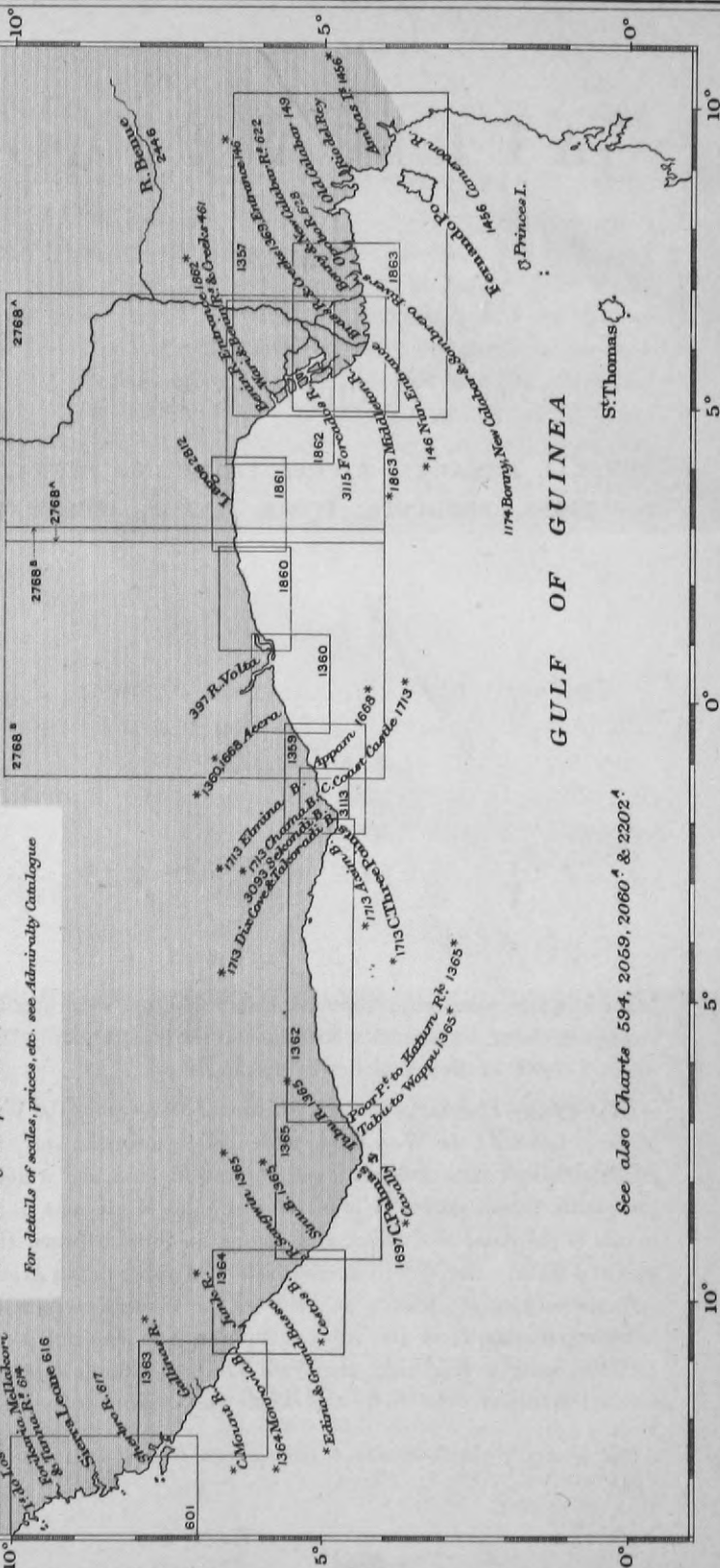
against a name indicates that a plan of the place is given on the coast chart, which is shown by the diagram to embrace it. A number against the name of a place shows that a separate plan is published bearing that number. A number and a star thus, 146, shows that a plan of the place against which it is written is given upon sheet 146.

For details of scales, prices, etc., see Admiralty Catalogue

For Charts & Plans North
of this see other Index

For Charts & Plans South
of this see other Index

NOTE
The charts & plans shown on this Index
represent those published at the date
given at the foot. They are liable to
alteration and amendment.



See also Charts 594, 2059, 2060* & 2202*

For the latest information respecting the lights described in this volume the mariner is referred to the Admiralty List of Lights, Part IV. This List is published early in the current year, corrected to the preceding 31st December.

AFRICA PILOT.

PART I.

CHAPTER I.

GENERAL REMARKS, RIVERS, FLORA AND FAUNA, POPULATIONS, PRODUCTS, PORTS, TRADE, COMMUNICATIONS, CLIMATES, WINDS AND WEATHER, CURRENTS, COAL, AND PASSAGES.

GENERAL REMARKS.—The coast of Africa included in this work extends from the parallel of Tangier in 36° N. to the Cameroon river in 4° N., and embraces the kingdom of Morocco; the Spanish possessions on the coast from Morocco to the French colony of Senegambia; the British colony of Gambia; the Portuguese colony of Guinea; the French Sudan; the British colony of Sierra Leone; the republic of Liberia; the French colony of Kong; the British colony of the Gold Coast; the German colony of Togoland; the French colony of Dahomey; and the British protectorate of the whole Niger delta; it also includes the off-lying islands of Azores, Madeira, the Canaries, and the cape Verde islands.

MOROCCO extends from Tangier to cape Juby. The Empire, which is an absolute monarchy, contains about 314,000 square miles, but the fertile regions of the mountain districts and the coast are only 76,000 square miles, 217,000 of the remainder being the Sahara.

Rivers.—The rivers on the west coast of Morocco are the Wadi-el-Khos or river Lukkos; the Wadi Sebu, which, rising near the foot of the Atlas mountains, eastward of the cities of Fez and Meknās, and winding through the plains, passes within 6 miles of Fez; the Wadi Abu Regreg, rising in one of the Atlas mountains, and having its outlet between the towns of Sali and Rabat; the Wadi Um-er-Rebia, also rising in the Atlas mountains and discharging its waters at Azimur; the Wadi Tensift, fed by several tributary streams from the Atlas mountains, and entering the sea about 16 miles south-west of Safi; the Wadi Tidsi, the mouth of which is about 6 miles south of cape Sim; the Wadi Sus, rising at Ras-el-Wed, and

See Admiralty chart:—Straits of Gibraltar to river Gambia, No. 1,226; scale, $d = 1.4$ inches.

flowing into the sea about 5 miles south of Agadir; the Wadi Mesa and Wadi Assaka, about 20 and 85 miles respectively south-west of Agadir and the Wadi Draa and Wadi Shibiki, the outlets of which are 5 and 36 miles respectively from cape Nun.

Flora and Fauna.—The flora of Marocco is essentially European, and the fauna partakes of a similar character. The Barbary fallow deer, wild boar, Barbary monkey, a species of porcupine, and wild cat are the most characteristic mammals. The birds and fishes are those of southern Europe, also, with a few exceptions, the reptiles and amphibia. Locusts frequently devastate the country.

Minerals.—Little is at present known regarding the minerals, but it is asserted that gold, copper, tin, argentiferous galena, nickel, antimony, iron, and manganese abound, and coal and petroleum have been indicated.

Population.—The population of Marocco has been variously estimated at from 4,500,000 to 8,000,000; the Jews number about 300,000. The population of the three capitals is estimated as follows:—Fez, 120,000; Marocco, 50,000; and Mequinez, 56,000.

Products.—Wool is plentiful; wheat, barley, and maize are largely grown, also cotton and hemp for home consumption; oranges, figs, almonds, lemons, dates, and various gum plants are cultivated, and cattle are exported.

Trade.—The exports consist of almonds, maize, beans, peas, oil, wool, dates, oxen, fowls, eggs, carpets, slippers, goat-skins, leather, grain, ostrich feathers, gums, and esparto grass; the imports—cotton, linen, muslin, and woollen goods, tea, coffee, sugar, candles, cloth, silk, iron, brass, hardware. &c.

Ports.—The principal ports, none of which can be called harbours, are Tangier, El Araish, Rabat, Dar el Beida, Mazighan, Safi, Mogador, and cape Juby; landing is permitted only at these ports.

Communication.—Steamships.—The steamers of the *Compañía Trasatlántica* of Barcelona make one voyage monthly to ports on the west coast of Marocco; after leaving Cadiz they call at Tangier, El Araish, Rabat, Dar el Beida, Mazighan, Safi, and Mogador, visiting the same ports on the return journey. A steamer of the same line sails from Cadiz for Tangier on Monday, Wednesday, and Friday of each week, returning on the alternate days, and Tangier has daily communication by steamer with Gibraltar and Ceuta. The steamers of Messrs. Haynes, of Cadiz, call about every fortnight at Tangier on their way to other Moorish ports, and the Royal Netherlands Steamship Co.'s steamers call about every month on the voyage to Italy.

See chart No. 1,226.

The trade on the coast of Marocco is entirely worked by the British line of Messrs. Forwood Bros., the French line of Paquet and Cie. and the Sloman line from Hamburg. The large steamers of the Woermann line only stop for a few hours at Tangier, Dar el Beida, Mazighan, and Mogador.

Telegraph.—The Eastern Telegraph unites Tangier with Gibraltar and England.

Fisheries.—Sardines are abundant on this coast; but the true sardine is said not to be found south of the river Ouro; the fishing is generally prosecuted in the summer, from April to September, but weather permitting, they are caught all through the year. Seine nets are hauled on to the beach, and the fish are not sought out at sea, as on the Brittany coast.

Shebbel, a rich variety of shad (*Clupea alosa*), are taken in large numbers in the principal rivers in spring, and salted down for land transport; they are exceedingly plentiful in the Wadi Sebu and Nun river. The tasergelt, said to be identical with the American blue fish, and the big aslimsah (*sciæna aquila*), frequent the coast; the former from the end of August until November. Between cape Spartel and Dar el Beida, from the beginning of May to the middle of June, shoals of bonito give profitable employment to a number of Portuguese small craft; there is also reported to be mackerel fishery near Arsila, and the tunny appears to be very numerous on this part of the coast.

Immense quantities of mackerel are found off Dar el Beida during several months of the year; Portuguese fishing craft occasionally arrive to prosecute the fishing, using short rods with hook and line; the fish are salted down for home or Spanish consumption.

Climate.—The summer heat along the whole coast of Marocco is modified by the coolness of the sea water, which, from Tangier to the southward, is several degrees below the temperature of the water on the south coast of Spain at that time. The climate of Tangier is salubrious, and the winter rains are moderate. At Mogador the climate is also exceedingly good; sea breezes are always blowing, and there is scarcely any rain from April to October, and only now and then in the remaining portion of the year. Cases of diseases from malaria are rare, and hardly ever occur in Europeans. Tuberculosis was unknown until about ten years ago; since which time it has increased amongst the natives.

Diseases of the eye are prevalent, mostly among the Jews; the crews of vessels are sometimes subject to a kind of gastric fever, which lasts from three to four days and then subsides.

At cape Juby the air is pure, dry, and clear, and the weather not subject to sudden changes, the climate being very similar to that of the Canary

islands; the diseases of hot and malarious districts, such as dysentery, intermittent and blackwater fevers, are unknown; during the twelve years' occupation by the Europeans no case of fever occurred.

SPANISH PROTECTORATE.—The coast of Sahara extends from the Wadi Shibika to the Senegal river, and this comprises the west limit of the desert of Sahara, named by the Arabs El-Baba-Billâ-Maâ, or sea of sand; the soil being composed of pure sand, unmixed with any other substance. This vast plateau, the surface of which is levelled by the sands of the desert, terminates sometimes in cliffs, at others in gradual slopes; the former are composed of layers of different shades of light-coloured sand, the under layers being thinner than the others, and of reddish tint.*

So far as the parallel of 23° N. the soil is nearly always covered with a dark substance, which has some hardness, and the encroachments of the sea causing enormous blocks of this substance to fall to the foot of the cliffs, they appear like immense rocks, and the sea breaks against them with great violence; but after a time they are dissolved by the water. There is not a trace of rock or granite on the whole of this coast so far as cape Verde.

The portion of the coast of the Sahara between cape Bojador and cape Blanco is under the protectorate of Spain. Between cape Blanco and cape Verde the coast is formed of either sand-downs or sandy beaches.

Ports.—The principal port is the Ouro river.

Fisheries.—A fishery, which is prosecuted by the inhabitants of the Canary islands, commences at cape Nun; the fishermen seldom venturing further to the northward, though fish are there equally abundant, from their dread of the Moors, who, on that part of the coast possess boats. But from cape Nun to the bank of Arguin, which is the southern limit of the fishery, a distance of about 600 miles, the inhabitants are unprovided with boats; and the fishermen, therefore, not only fish on the bank close inshore, but frequently land, as well to barter their fish for orchilla and the fine Barbary wool, as to procure water, but always with the greatest circumspection. The fishermen come principally from Arrecife, a large number of the inhabitants of that district being engaged in these fisheries.

It is reported that the true cod is found on banks off the coast, between cape Bojador and cape Blanco, though inferior in size and flavour to the cod of Newfoundland and the North sea. Spanish fishermen from the Canary islands work the fisheries from the latitude of those islands to South cape Blanco, for aslinsah, which weigh from 30 lbs. to 80 lbs. each; also for tunny and other large and valuable fish. Their fishing vessels are

* See Admiralty charts:—Santa Cruz to cape Bojador including the Canary islands, No. 1,229; scale, $m = 0.07$ inch, and Garnethead to cape Verde, No. 1,230; scale, $m = 0.07$ inch.

met with between cape Bogador and Durnford point, where they salt and cure fish for the supply of the islands. The Spaniards have established fishing stations along the portions of this coast which is under their protection.

SENEGAL AND SENEGAMBIA.—The coast line of this part of Africa extending from Levrier bay (lat. 21° N.) to Sallatuk point (lat 9° N.) belongs principally to France: it is interrupted only by the small British colony of Gambia; and the Portuguese territory extending from cape Roxo to Katak island, or between the parallels of $10^{\circ} 50'$ and $12^{\circ} 20'$ north latitude. With these small exceptions the area of the whole of Senegal and Senegambia running inland to Timbuktu and beyond the Upper Niger is recognized as French territory.

The coast in the northern part of this territory is, like that of the Sahara, low, arid, desolate, and skirted by dunes, relieved only occasionally by cliffs and plateaux; further south it becomes low, marshy, and clothed with luxuriant vegetation, whilst behind the low seaboard the country rises into a vast plateau, terminating eastward in a mountainous region which divides the Niger valley from the Senegal and Gambia.

The district in Senegambia acknowledging the sovereignty of France, is estimated at 280,000 square miles.

Rivers.—The principal rivers are the Senegal rising in the northern part of a belt of mountains which skirts the coast east of Sierra Leone, and having a general north-west course to the sea; the Salum, the Jumbas, the Gambia, the Kasamanze, the Cacheo, the Jeba, the Bolola or Rio Grande, the Cassini, and the Rio Nunez. A considerable part of the Gambia is in British territory, and the Cacheo, Jeba, Bolola, and Cassini are in Portuguese territory.

Geology.—The geology of the country is very imperfectly known, the low seaboard consists of sandstones or clay rocks and loose beds of reddish soil. At certain points, such as cape Verde and cape Roxo, the sandstone crops out, and its red colour has given cape Roxo or Rouge its name. Clay slates also occur, and, at intervals, basaltic amygdaloid and volcanic rocks. The island of Gorée is basaltic, the Bissagos are composed of scoriæ, &c. Iron and gold are found in the mountains.

Flora and Fauna.—The baobab trees (*Adansonia digitata*), acacias, palm trees, kola nut trees, fig trees, and orange trees, all flourish; the cultivated plants are millet, rice, tobacco, ground nuts, indigo, maizes, and sugar cane, &c.

Lions, leopards, wild cats, the cheetah, civet, and hyæna are amongst the beasts of prey. Antelopes and gazelles occur in large herds in Upper

See chart No. 1,230.

See Admiralty chart:—Cape Verde to river Cacheo, including the Gambia river, No. 599; scale, $m = 0.14$ inch.

Senegambia, the giraffe is common in Upper Senegal, and crocodiles swarm in the Senegal river. Monkeys, squirrels, and mice abound. Amongst the noteworthy birds are the ostrich, the bustard, partridges, quail, and guinea-fowl. Along the coast codfish are found.

Population.—The population cannot be ascertained with any approach to accuracy. It comprises three distinct races, the Moor, the Negro, and the European.

Products.—The principal exports are gold, ground nuts, gum, palm kernels and oil, and india-rubber.

Trade.—In 1897 the imports to Senegambia amounted to £1,167,000, and exports to £845,000.

Ports.—The important ports are St. Louis in the Senegal river and Dakar just east of cape Verde.

Communication.—Several lines of steam vessels call at the Senegambia ports, and small steamers ascend the Senegal river.

The Marseilles Steam Navigation Company have regular monthly sailings to Dakar.

Railways.—There is railway communication between Dakar and St. Louis, a distance of 175 miles; the produce of the district lying south of the railway is sent principally to Dakar, and that from the district north to St. Louis. There is also a railway from Kayes to Diubéba, on the Senegal river, a distance of about 30 miles; this railway is in course of construction to Manambugu, on the Niger, about 20 miles east of Bammako.

Telegraphs.—Telegraphic communication with Tenerife, Pernambuco, *viâ* Fernando Noronha, and Dakar by cable, and by land lines to stations on the Senegal river, and inland to Timbuktu and so far east as Wagadugu.

Climate.—The climate is not so unhealthy as is frequently asserted. There are two seasons, the dry and the rainy; the rainy season commences early in June and ends in November, the dry season comprising the remainder of the year.

Along the seaboard the dry season is cool and agreeable, the mean temperature being about 68°; in the interior the temperature during December, January, and February is cool, but with March, hot easterly winds set in and raise the mean temperature to 91°. In the north the N.E. trade blows for eight months, and land and sea breezes are only felt near the coast. During the rainy months a gentle S.W. monsoon occurs, accompanied by frequent calms, tornadoes, and rains. Southward of Senegal the trade wind decreases in strength and duration, and the S.W. monsoon is more powerful and persistent in the rainy season. The amount of rain, and number of days on which it falls, increases from north to south.

See charts Nos. 1,230, 599.

GAMBIA.—The British colony of Gambia consists of a strip of territory on each side of the river Gambia of a little more than 11 miles in width, extending inland to 5 miles east of Yarbunda in longitude 13° 55' W.

It was discovered by the Portuguese in 1447, and in 1588 a patent was granted by Queen Elizabeth to some merchants of Exeter to trade in the Gambia; in 1618 a company was formed for the purpose of carrying on the trade. In 1816 a new settlement was formed on the island of St Mary. In 1843 it was created an independent colony. Since 1866 it has been a portion of the Government of West Africa Settlements.

The river Gambia rises in the Futa-Jallon highlands, and is known by the Fulas, as the Dimma: it has a total length of 720 miles from its source to the estuary at Bathurst.

Population.—The estimated population in 1897 was 14,266; the natives being chiefly Mandingans and Fulas.

Products.—Ground nuts form nearly nine-tenths of the total exports; they are sent chiefly to Marseilles, where the oil is extracted and used for the same purposes as olive oil. Rice, cotton, maize, and a kind of millet (*kous*) are produced in the districts bordering on the Gambia, but not in sufficient quantities for export.

A botanic station was established at Bathurst in 1894.

Trade.—The principal exports are ground nuts, beeswax, hides, and rubber, which in 1898 amounted to £245,110. The imports were valued at £187,062, and consist of cotton, tobacco, kola nuts, arms, gunpowder, spirits, rice, sugar, and general goods.

Communication.—Steamships.—There is regular communication by steam-vessels once in three weeks to London, and every alternate Saturday to Liverpool.

Telegraph.—There are two cables to Sierra Leone, from one of which there are branches to Bissao and Konakri, and cables to St. Vincent and Dakar.

Climate.—The climate consists of dry and wet seasons, and is similar to that of Senegambia described at page 6. Vessels making any lengthened stay in the river during the rainy season may escape evil consequences by proceeding, and remaining, outside periodically for a few days at a time.

Intermittent and remittent fever, yellow fever, rheumatism, and dysentery, are the diseases against which special precautions are required.

The climate of Bathurst, owing to its low-lying position, is, during the rainy season, July to October, very trying, and again, in the dry season, the great diurnal variations in temperature are equally trying to some constitutions. In the first months of the year, the thermometer standing

at 68° Fahr. at sunrise, has reached over 100° Fahr. by 3 o'clock in the afternoon.

PORTUGUESE GUINEA.—The Portuguese colony of Guinea, between cape Roxo, in lat. 12° 20' N. to lat. 10° 54' N., including the Bijouga islands, has an area of 14,370 square miles, and was acquired in 1885. The seaboard of Portuguese Guinea is principally occupied by the estuaries of rivers and numerous peninsulas and archipelagoes.*

Flora and Fauna.—Savannahs (*campinas*) of tall grasses or reeds, with a few isolated palms, baobabs, or butter trees, cover extensive tracts, and in the forest proper, behind the mangrove fringed banks of the estuaries, there is a variety of trees, such as acacias, date and oil palms, and what is known as the “rain-tree,” on account of it collecting night dew on its foliage and precipitating it in the morning.

The fauna is richer than that of Senegal, and includes numerous species of apes, amongst which, it is said, is the chimpanzee; the hippopotamus, wild ox (*bos brachyceros*), leopard, and crocodile abound. Birds are numerous, and the creeks and estuaries well stocked with fish.

Population.—The population, which consists of a number of native groups, is about 1,500,000, the principal nations being the Biafars, Papels, and Bujagos.

Products.—Corn, sugar, and vegetables are grown, and ground nuts and copal exported.

Ports.—Cacheo and Bissao are the principal ports.

Communication.—There is telegraphic communication by cable between Bissao, Bulama, Konakri, Bathurst, and Sierra Leone, and by land lines from Konakri to Timbuktu and Wagadugu.

Climate.—The climate is similar to that of Senegal, except that the mean temperature is higher and subject to greater extremes. Near the coast the temperature sometimes falls at night to 53° Fahr., and the mean at Bissao for the whole year is 78° Fahr.

The Bijouga islands are generally very unhealthy, but some of the seaward islands, notably Formosa, are said to be less so than the others, owing to the sea breeze. Bulama, on the Bolola river, is also unhealthy, especially during the bad season, commencing with June, at which time bilious fevers are prevalent. June, July and August are the worst months, when tornadoes are prevalent.

The rainfall is very considerable, but has never been accurately measured; the rainy season lasts for about five months from the middle of May to the end of September.

FRENCH SUDAN.—The coast between Tristao island and the northern boundary of Sierra Leone Protectorate, in lat. 13° N., is known

* See Admiralty chart :—Cape Roxo to Isles do Los, No. 600; scale, $m = 0.13$ inch.

as the Southern rivers of Senegambia, and embraces an area of about 300,000 square miles.

Although this region has been frequented since the fifteenth century, it is only partly explored, and like Portuguese Guinea the seaboard is broken into peninsular formations, which, at high water, are converted into a labyrinth of islets.

In this district are the petty states of Cobo and Kabilai, between latitudes 9° 30' N. and 10° N., or immediately north of Isles de Los, and commanding the mouth of the river Braméya, which discharges its waters into Sangaria bay; the former state is a flat country of about 48 square miles in extent, and the latter a mountainous district, containing about 120 square miles.

With the exceptions of the Nunez and Skarcies basins, this region, notwithstanding its fertility and boundless resources, is very little known.

Flora and Fauna.—The flora and fauna are somewhat similar to north Senegambia; plants yielding india-rubber abound in the forests of the Nunez river, and the coffee of the same region is well known in commerce. Here the oil palm (*Elæis guineensis*) first acquires the importance of an economic product, and the Mellakori basin is a chief centre of the kola nut (*Sterculia acuminata*) industry; the trees attain heights of from 65 to 70 feet.

Population.—The population of these territories is estimated at between 3,000,000 and 4,000,000.

Trade.—In 1897 the value of the imports amounted to £240,000 and exports to £201,000, these figures being for French Guinea, no returns being available for the whole of the Sudan.

Ports.—Konakri, the principal port and the capital of French Guinea, is situated on the west side of Tumbo island.

Communication.—Steamships.—The Marseilles Steam Navigation Company have regular monthly sailings to Konakri, and there are other steamers at irregular periods.

Telegraph.—A cable connects with Bathurst, Bissao, Konakri, and Sierra Leone, and there is a land wire to stations on the Senegal river, Timbuktu, and St. Louis.

Roads.—A road, in course of construction from Konakri to Farana, on the Niger river, was, in 1897, finished beyond Timbo, and expected to be completed in about two years; the merchandise of Timbuktu, and the district round, will reach Konakri by this route.

Climate.—The climate somewhat resembles that of Senegambia (see page 6), but the Nunez river is exceedingly unhealthy, especially during November and December, when thick fogs prevail; the harmattan season is from January to March, when the nights are

cold, with thick haze; the wet season commences in May and ends in September.

The climate of the Cassini river differs entirely from that of the neighbouring rivers, as, owing to its banks being comparatively clear from mangroves and vegetation, the sea breezes are experienced for some distance inland.

SIERRA LEONE, the most important British possession on this coast, with a coast line over 180 miles in length, the colony including an extent of country estimated at 4,000 square miles, was ceded to Great Britain in 1787 by the native chiefs. In 1896 a protectorate was proclaimed over the territories adjacent to the colony, lying between lat. 7° and 10° N. and long. $10^{\circ} 40'$ and $13^{\circ} 20'$ W.; this has an area of about 20,000 square miles. The line of demarcation of the colony on the north, after dividing the basin of the Mellakori river from that of Great Skarcies river, reaches the 10th degree of North latitude and extends to $10^{\circ} 40'$ W. longitude. Manna river is the southern boundary, the isles de Los being included.*

Geology.—The argillaceous soil on the coast of Sierra Leone overlies a subsoil of coarse and ferruginous sandstone, easily cut with a hatchet, but rapidly hardening by exposure, and forming an excellent building material. Boulders of blue 'granite and other crystalline rocks, round and blackened by the action of the sun and atmosphere, are also found.

Flora and Fauna.—There are large tracts of forests of rubber trees and trees yielding valuable timber; the butter and tallow tree (*Pentadesma butyracea*) sometimes attains a height of 70 feet, the oil from seeds of the berry of this tree is extensively used by the natives for cooking purposes.

A botanic station, covering about 17 acres of ground, was established at Sierra Leone in 1895. The most promising economic plants are the highland or native coffee (*Coffea stenophylla*), the native cotton (*Gossypium herbaceum*), and cacao.

Population.—The population is made up of many different races, including a large number of Mahomedan negroes; in 1896 the population of the protectorate was estimated at 500,000; the dominant race, in the interior, being the Timni nation.

Products.—The principal products are rubber, gum, and palm trees, benni seed, rice, ground and kola nuts; sheep and cattle thrive.

The soil is fertile, there is an abundance of freshwater, and tropical fruits grow luxuriantly; pine apples especially are produced very abundantly, and the other fruits include bananas, plantains, avocado pears, mangoes, limes, and oranges.

* See Admiralty chart:—Isles de Los to Sherbro island, No. 601; scale, $m = 0.25$ inch.

Trade.—In 1897 the imports were valued at £457,000, and the exports at £401,000. The chief exports are camwood, kola nuts, ginger, gum copal, hides, ivory, palm oil, palm kernels, rice, and india-rubber; the imports consist of wearing apparel, cotton in pieces, earthenware, hardwares, flour, gin, rum, tobacco, lumber, kerosene oil, salt, and wine.

Communication. — Steamships. — The African Steamship Company and the British and African Steam Navigation Company have a regular service to Sierra Leone, both carrying mails; there are also steamers at irregular periods.

Railway.—A railway constructing between Freetown and Rotifunk was opened for traffic in 1899 so far as Waterloo, about 14 miles from Freetown.

Telegraph.—There are three submarine cables from Sierra Leone, two to Bathurst, and one to Accra.

Climate.—At the isles do Los the dry season commences in December and lasts to the end of March; from April to June is the tornado season, and from June to September that of rains; in the latter the thermometer seldom reaches 86° Fahr. From September to December is again a season of tornadoes and bad weather, and these two breaks between the dry and of rainy seasons are the most unhealthy.

The climate of Sierra Leone is extremely equable, and, except the succession of dry and rainy periods, has no alternation of seasons; the difference in temperature between April and August is scarcely more than 7° Fahr., and the sea breezes prevail, along the coast, during the hottest part of the day.

But as in the neighbourhood muddy banks are exposed at every tide, and there are still undrained marshy tracts, the poisonous exhalations which rise from these places, and are afterwards confined by the encircling hills, render Sierra Leone a most unhealthy residence for Europeans. Even on the slopes of the hills the rapidly evaporated water, which has been absorbed by the ferruginous sandstone, contributes to the insalubrity of the climate during the rains, which, commencing in May and ending in September, constitute the most sickly season; the commencement and ending of the rains being the worst.

African fever is the principal disease, there is little dysentery or diarrhoea. The usual precautions of keeping out of the sun and avoiding chills (for which wearing flannel is recommended) are necessary.

Fevers and venereal diseases are not prevalent at either Banana islands, Kent or York villages, small pox is very rare, but yaws, a species of ulcer (*medfambrosia*) is prevalent at all seasons. Banana islands may be considered as a sanatorium for men-of-war.

In the Sherbro river malarial fever prevails, chiefly at the approach of the rains in May and June, and also towards their termination in October and November; rheumatism and diarrhoea are prevalent during the rainy season. Sherbro island is said to be very unhealthy for Europeans, but the climate of Bendu is better.

LIBERIA, an independent African Republic, first colonised in 1820, and recognised as an independent State in 1847, occupies that part of the coast between the Manna river, to the north-west, and the river Cavally, on the south-east, in long. $7^{\circ} 32' W.$, a distance of about 290 miles, with an area of about 48,000 square miles, and extending to the interior to lat. $8^{\circ} 50' N.$, a distance of 250 miles from the seaboard. The principal rivers are St. Paul, Cestos, Sangwin, and Cavally.*

Geology.—The prevailing formation appears to be a ferruginous sandstone covering a reddish clay, but in several places, especially east of Monrovia, eruptive rocks have cropped out. Granite boulders, several of which are scored with striae, are strewn on the declivities of the Mandingan plateau.

Flora and Fauna.—There are oil palms and india-rubber trees, the cocoa nut grows in great profusion, and the Liberian coffee plant sometimes attains heights of from 40 to 50 feet, while the dwarf palm (*hyphæne*) only reaches a few feet from the ground. The native flora includes a “fever tree,” the foliage of which appears to possess the efficacy of Peruvian bark, and the dunes are covered with plants such as the convolvulus.

Antelopes, buffaloes (the formidable bush cow of the Liberians), and elephants frequent the savannahs; the hippopotamus and crocodile are rare, nor are rapacious animals very numerous; there are neither lions nor hyænas, but leopards and chimpanzees are occasionally seen. The woods hold several species of monkeys, and in the clearings are various antelopes, including the *spinigera*, the smallest of the gazelle family. Domestic animals, such as horses, oxen, goats, and sheep thrive well in the settled districts; insects swarm all over the country.

Population.—The population numbers 25,000 Negro emigrants from America and their descendants, and about 1,500,000 aborigines. Monrovia is the capital, and has a population of 6,000.

Products.—Palm oil, india-rubber, coffee, and camwood (*baphia læmatoxylon*) are the principal products, the latter being used for dyeing textiles; potatoes, said to attain a weight of 10 lbs., are grown on the Mandingan plateau, which is extremely fertile.

Trade.—The chief exports are coffee, cocoa, sugar, wax, ginger, palm kernels, palm oil, indigo, hides, ivory, gold dust, &c. In 1897 the value of the imports amounted to £105,257, and the exports to £143,548.

* See Admiralty charts :—Sherbro island to cape Mesurado, No. 1,363; scale, $m = 0.25$ inch, and cape Mesurado to Baffu bay, No. 1,364; scale, $m = 0.25$ inch.

Ports.—The principal ports are Cape Mount, Monrovia, Grand Bassa, and Sinu.

Communication.—The British and African Steam Navigation Company have a regular service of steamers to Cape Mount, Monrovia, Grand Bassa, and Sinu.

Climate.—Although the general distribution of the seasons is the same as in Senegambia, they are not so regular as on the more northern coast. The dry season lasts from December to the end of April, and the wet from the beginning of May until the middle of August, after which there is an interval of fine weather, followed by fresh rains commencing about the end of September.

The mean annual temperature of Monrovia is not more than 81° Fahr., the daily range being about 9°, the greatest extremes occurring during the dry season, when the intense heat of the day is followed by cool nights; and at this time Europeans suffer most, but for them the climate is always unhealthy, although less so than that of Sierra Leone.

KONG.—Between the river Cavally, in long. 7° 32' W., and 1,000 metres, or rather more than half a mile, west of Newtown, a distance of nearly 290 miles, is the seaboard of the French colony of Kong, the town of the same name being about 220 miles in a direct line from the coast.

Geology.—Little is known of the geology of this colony, except that most of the cliffs appear to be of sandstone formation.

Flora and Fauna.—The flora, also little known, is probably similar to that of Liberia; the only plant extensively cultivated is coffee.

Elephants are occasionally seen on the coast, but the hippopotamus, once fairly common in the creeks and lagoons, has now disappeared. There are three species of monkeys, including the chimpanzee, and sloughs of pythons, over 30 feet long, have been found.

Trade.—In 1897 the value of the imports, consisting of wood, ivory, india-rubber, amounted to £188,000, and of the exports, £189,000.

Ports.—The principal ports are Grand Drawin, Grand Lahu, Half Jack, Grand Bassam, and Assini.

Communication.—Steamships.—The steam vessels of the British and African Steam Navigation Company and the Marseilles Steam Navigation Company call at Grand Lahu, Half Jack, Grand Bassam, and Assini.

Telegraph.—There is a cable from Grand Bassam to Accra, and telegraph stations at Drawin, Sassandra, Fresco, Grand Lahu, Grand Bassam, Jack Jack, and Assini.

Climate.—The climate resembles that of Liberia, having two rainy seasons in the year, and sickness is most common amongst Europeans during the month of October, with north-east winds.

GOLD COAST.—The British colony of the Gold Coast is comprised between a straight line from the sea coast at about half a mile to the west of Newtown to Tando lagoon, then along the left bank of that lagoon, of Ehi lagoon and river Tano as far as Nugua, and then in accordance with various treaties, to the 9th degree of North latitude; and Aflao, in long. $1^{\circ} 14' E.$, the boundary of the German colony of Togoland.*

It was formerly held by the Dutch and British, but in 1872 all the Dutch forts and settlements were transferred to Great Britain, when the Royal African Company was formed. In 1821 the settlement was transferred to the Crown, and placed under the Government of Sierra Leone, from which it was separated in 1874, as the Gold Coast Colony.

The original coast line along the Lagos colony to the Volta and further west must have been the northern bank of the inner line of inland waters. The strips of land that now intervene between the sea and mainland, and the deltas here and there, have been formed in the course of time by the continuous action of the surf, current, and prevailing winds upon the *débris* brought down by the different intersecting rivers. These are fringed with mangroves, salt bush—a willow-like shrub—and occasionally the *raphia vinifera*, the pounded pericarp of the fruit of which is used in still narrow creeks, to stupefy or poison fish.

Geology.—The gold in the Wassaw district is obtained chiefly from the gneiss and other primitive rocks; veins of silver, copper, and tin have been met with in the hills, and iron and manganese occur everywhere. Gold mines are also worked in Ashanti and especially in the provinces of Dadeassi and Inquanta. Cape Three Points, the most prominent headland on this coast, is composed of granite, diorite, sandstone, laterite, and conglomerate.

Flora and Fauna.—This colony is especially rich in palms of diverse species, and the butter tree and kola nut flourish in the northern forests. The inland hilly districts are clothed with dense forests of gigantic timber; the so-called “Karkum” having a diameter of from 8 to 10 feet and attaining a height of 200 feet.

Elephants, once common, are now seldom seen, and, for some distance from the coast, scarcely any game is to be met with, but in the more inland savannahs, especially in the Okwahu district, west of the Volta, elephants, buffaloes, gazelles, wild boars, and various kinds of carnivora abound; the hippopotamus and crocodile are numerous in the Volta. Two remarkable simians, one a black monkey with a white beard, the other ashy grey with a long silken coat, are found in the forests.

* See Admiralty charts:—Cape Three points to Barako, No. 1,359; scale, $m = 0.25$ inch, and Barako to cape St. Paul, 1,360; scale, $m = 0.22$ inch.

There are a great many varieties of butterflies; the American "jigger" (*Bulex pinetrens*) has been imported; the tsetse fly, or an analogous species, is fatal to cattle, and ants are exceedingly troublesome; a species of snail is said to constitute the staple food of Ashanti.

Population.—The colony and protectorate have a population of about 1,500,000.

Products.—The land, which is not generally cultivated, is naturally rich, the soil producing almost any commodity of market value—maize, yams, cassada, and plantains are grown. It abounds in the oil palm, rubber trees, and vines, the kola tree, with its valuable nut, and mahogany and other important woods.

A botanical station was established at Aburi, in 1890, machinery for coffee pulping has been imported, and instruction is given to the natives as to the best mode of growing the berry and preparing it for export. A quantity of Indian jute (*corchorus capsularis*) has been grown and allowed to seed, the seed being distributed in various districts.

Trade.—The produce of the Gold Coast is chiefly sent to Great Britain. Gold is one of the principal exports; the output from the mines in 1897 was 23,555 ounces, of the value of £84,797. This coast is the region of the oil palm, extracted from the fruit of the palm, *Elais Guineensis*, which grows in great profusion; palm oil, palm kernels, and india-rubber are largely exported; the values for the year 1896 being respectively £126,857, £85,349, and £313,817. The total imports in 1897 amounted to £784,188, and exports to £858,000.

Shipping.—The number of steamers which called at the ports of the Gold Coast in 1896 was 400, with an aggregate tonnage of 553,794 tons; and 16 sailing vessels, 6,874 tons.

Ports.—The chief settlements are Axim, Dixcove, Sekondi, Chama, Elmina, Cape Coast Castle, Winneba, Accra, and Kitta.*

Communication. — Steamships.—The African Steamship Company, carrying mails have a regular service of steamers to Cape Coast Castle and Accra. The steamers of the British and African Steam Navigation Company, also carrying mails, call at Elmina, Cape Coast Castle, Accra, Axim, Salt Pond, Pram Pram, Appam, Adda, Winneba, and Kitta.

Railway.—A railway is in course of construction from Sekondi to Tarkwa a distance of about 39 miles.

Telegraph.—There are cables from Accra to Sierra Leone, Grand Bassam, Kotonu and Lagos, and a land-wire to Kintampo; telegraph stations at Axim, Dixcove, Ajua, Chama, Elmina, Cape Coast Castle, Anamaboe, Salt Pond, Appam, Winneba, Accra, Pram Pram, Adda, and Kitta.

See charts Nos. 1,359, 1,360.

* The crews of the rudder canoes employed on the coast are Krumen or Minas from the Gold Coast.

Climate.—The arrangement and phenomena of the seasons are the same as on the coast lying further west. Tornadoes in March or April announce the advent of the wet season, these gradually falling off as the rains set in. With the commencement of the dry season the monsoon reappears, after which, in October, the short rains and most unhealthy season for Europeans commences. Dry weather sets in about the new year, and then the harmattan is most prevalent. African fever and dysentery are the most common diseases, yellow fever is unknown. The mean temperature in the shade is 82°.

TOGOLAND.—From long. 1° 14' E. to long. 2° 23' E. or nearly midway between Gadoimi and Kotonu is the German colony of Togoland, the limits of which were adjusted in July 1897; it has an area of 23,160 square miles.*

Togo, the old capital, comprised five villages situated on the north side of the chief lagoon: Little Popo is the present capital.

Flora and Fauna.—These are simply a continuation of those of the Gold Coast (*see* pages 14, 15).

Population.—The inhabitants number about 850,000, and consist of Minas, and the Ewe family, which latter forms five distinct linguistic groups, viz.:—the Anlos, Krepis, Jejis, Dahomeens, and Mahis.

Products.—The chief crops are maize and ground nuts, and of the whole area about one-twentieth is under cultivation.

Trade.—In 1897 the value of the exports was £39,000 and of the imports £99,000, the exports are principally india-rubber and ivory.

Ports.—The ports are Little Popo, Agweh, Great Popo, and Whyda.

Communication.—The steam vessels of the British and African Steamship Company call monthly at Little and Great Popo.

Telegraph.—There are telegraph stations at Little Popo, Agweh, Great Popo, and Whyda.

Climate.—The climate is considered to be the most salubrious on the whole of the coast, south of Senegal, the mean temperature is about 78° Fahr., and there are two dry and two wet seasons. Europeans are subject to marsh fevers on first arrival on this coast, also at the close of the heavy rainy season when the atmosphere is full of miasmatic exhalations.

November to February inclusive are the most healthy months of the year; the temperature, in the shade, scarcely varies by night or day above or below the limits of 85° and 90° Fahr.

FRENCH COLONY OF DAHOMEY.—Between the eastern boundary of Togoland and the Ajarra creek, long. 2° 44' 30" E.,

* *See* Admiralty charts:—Cape St. Paul to Porto Novo, No. 1,860; scale, $m = 0.2$ inch, and Porto Novo to Lekki, No. 1,861; scale, $m = 0.25$ inch.

a distance of about 21 miles, is the seaboard of the French colony of Dahomey, which, inclusive of the protectorates, contains an area of about 4,000 to 5,000 square miles; the capital of the colony is Abomey.

Trade.—In 1897 the value of the imports, consisting of wine and spirits, general commodities, and cotton goods, amounted to £330,000, and of the exports, principally palm oil, seeds, and fruit, to £231,000.

Ports.—The principal port is Kotonu, and the town of Porto Novo is in this territory.

Communication.—**Steamships.**—The British and African, and the Marseilles Steam Navigation Company have a regular service to Kotonu.

Telegraph.—There are cables to Accra and St. Paul de Loanda, *via* St. Thomas.

Climate.—*See* Remarks on climate Togoland.

LAGOS COLONY AND PROTECTORATE comprises the islands of Lagos and Iddo, and reaches from the boundary of the French Protectorate on the west, which is the Ajarra river, to where it ceases to separate the kingdom of Porto Novo from that of Pokra, and thence to latitude 9° N.; and from the meridian of Ajarra river (long. 2° 44' 30''), in Porto Novo lagoon, south to the sea coast; nearly to Benin river in long. 5° 10' E. on the east.*

The protectorate comprises the kingdoms of Pokra, Okeodan, Ilaro, Addo, Igbessi, Awori, Jebu Remo, Mahin, Ogbo, and Jakri up to the right bank of the Beniu river on the east, where it adjoins the territory of Southern Nigeria.

In 1894 the important strip of the Jebu country extending from the river Oqun to the river Oshun, and the kingdom of Jebu Remo were added to the area of the protectorate.

Lagos island and port was ceded to Great Britain by King Docemo in 1861. In 1866 the territories were separated from the Gold Coast Colony, and erected into a separate colony. It has now a constitution of its own, having Badagri in the west, and Palma and Lekki to the east.

Rivers.—The Abeokuta river, having, at about 45 miles from its mouth, the extensive native town of the same name, and the Oshun river, nearly 40 miles to the eastward, discharge into Kradu water; from the mouth of the Oshun there is a branch said to communicate with the Benin river.

Population.—The population of the colony and protectorate is estimated at 2,000,000.

Products.—The most important natural products are palm oil and palm kernels. Camwood grows, and bar wood has been brought from inland; dyewoods and gum are also said to abound, and gold is reported

See charts Nos. 1,860, 1,861.

* *See* Admiralty chart :—Badagri to cape Formosa, No. 2,768A; scale, $m=0.1$ inch.

e 3667.

B

to be found in the interior regions. The fishing industry is growing in importance. A botanic garden was established at Lagos in 1888.

Trade.—In 1894 commenced a very large development of the rubber industry from the tree known as the *Kichxia africana*; in 1896 the export amounted to £347,730, but it is feared that reckless over-tapping of the trees will cause a great falling off in the quantity exported. Palm kernels, palm oil, and rubber are the chief exports; ivory, cotton, and guinea grains are also exported; the value of the imports during 1897 amounted to £771,000, and of the exports, £772,000.

Communication.—Steamships.—The steam vessels of the African Steamship Company and British and African Steam Navigation Company, carrying mails, have a regular service to Lagos; other steamers call at irregular periods, and Lagos has communication with the interior by means of the lagoons and creeks, which extend in all directions.

Railway.—The railway from Lagos to Otta and Abeokuta opens up an important palm oil district.

Telegraph.—There are cables to Accra and Brass river; land lines to Sakio and Jebba, *viâ* Ibadan.

Climate.—The climate of Lagos is peculiarly fatal to the European constitution, which is probably partly due to the town being built on an alluvial island at the mouth of the river, and a congested native population residing, under very insanitary conditions, in a small corner of this island. Sickness has been generally found to follow the curve of the rainfall, and the most fatal months, December and January, appertain to the second curve, or drying up of what is known as the “little rainy season.” At Ibadan, about 50 miles from the lagoon, the climate is comparatively healthy.*

Malarial fevers, dysentery, diseases of the liver and spleen, and sunstroke, are the diseases due to climatic causes, against which special precautions are requisite. The rainy season is from May to October.

SOUTHERN NIGERIA.—This British Colony includes the territories on the coast between the eastern boundary of Lagos and the right bank at the mouth of the Rio del Rey; from there the eastern boundary extends north-eastward to Yola on the Benue river. It also comprises the territories in the basin of the Niger and its affluents, as far as Ida on the Niger. Above Ida is the colony of Northern Nigeria.†

The Niger trading Company maintains 42 stations on the Niger, of which the most important are—Burutu, near the junction of the Forcados and Wari rivers; Akassa, at the Nun entrance; Asaba, the administrative head-quarters, 150 miles up the river; where are the supreme court, the central prison, a hospital, and a botanical garden; and Lukoja at the

* Sir Gilbert T. Carter, K.C.M.G.

† See chart No. 2,768A.

confluence of the Benue, the head-quarters of the military force, which numbers about 1,000 men, chiefly Hausas, and officered by Europeans. About 30 steamers navigate the Niger and its tributaries.

Niger river.—The river Niger, and its delta, will be found fully described at pages 476, 446, respectively.

Flora and Fauna.—Dum and date palms, the deleb, oil palm, and cocoa nut flourish, and in the western forests is found the *liña* or *runa*, the fruit of which yields honey. The most widely cultivated plant in the Benue basin is a cotton with a remarkably firm fibre, and so glossy that articles made from it resemble silk.

Four kinds of corn are grown in the districts surrounding the Benue: the maize (*zea mays*) universally cultivated; two kinds of Guinea or Dáwa corns, a species of *Holens*, with stalks of from 8 to 10 feet in height; and the Géro, a species of *Penicillaria*, from which beer is prepared.

In the uplands two species of elephants are said to exist, there are also rhinoceros and wild buffalo, and the gorges are infested by the panther. Snakes are uncommon, and there appears to be a total absence of spiders.

Population.—The population of Nigeria is estimated as between 20,000,000 and 30,000,000, but the European inhabitants in 1897 never exceeded 214.

Products.—There are two forms of palm oil in the Niger Territories, known respectively as hard and soft; the soft, which is a liquid oil, is produced above Abutshi and in the Amamzara river. In other parts the oil is of the consistency of butter, the difference being only in the manufacture.

The bulk of the ivory exported from the Niger territories comes originally from the Adamawa province, the country lying between the Benue and Cameroons.

Trade.—The chief exports are palm oil, palm kernels, rubber, ebony, and ivory; the principal imports—cotton goods, coopers' stores, hardware, and cutlery; in 1897 the former were valued at £785,605, and the latter at £655,977.

Climate.—The delta of the Niger is exceedingly unhealthy, owing to the swamps, which cause malarial fever, and Europeans are seldom able to remain in this part for any time, but north of the confluence, with the Benue, there is a great improvement in the climate, which compares, not unfavourably, with India. The diseases chiefly to be feared in the northern parts of this territory are dysentery and sun-fever, both of which may be avoided with ordinary care.

In the region of the delta the rainy season is from July to October, most rain falling in September, and dry season November to February, and the actual amount of vapour present in the atmosphere is greatest in the months of April and December, and least during July and August;

the mean difference being about one seventh of the average quantity. The mean per centage of relative humidity has been found to be highest in September and lowest in July.

The rainy season on the Middle Niger commences in June and ends in September, rain falling less frequently than on the lower part of the river. March, April, and May are the hottest, and December and January the coolest months; in the former the highest daily temperature generally exceeds 90°, and is less than 90° during the rest of the year. The average night temperature is 80°.

PALM OIL RIVERS.—The streams which flow through the delta of the Niger are locally known as the Palm Oil rivers, and offer exceptional facilities for penetrating the interior; they are chiefly branches of the Niger, and form the Niger delta, but those to the eastward of the Niger have sources independent of that river. Although close to the sea coast, within tidal influence, the estuaries of these rivers are interconnected by a network of more or less navigable creeks, which, by a small amount of artificial aid, would render an inland navigation practicable between Dahomey and the Cameroon.*

During the rainy season the bars of some of the Palm Oil rivers are occasionally impassable, also at full and change of moon the crossing is worse than at other times.

The best time to enter is, as a rule, at the last quarter of the flood.

Commerce.—The natives on the banks of these rivers are exclusively devoted to the palm oil trade; to seek which they ascend the numerous creeks of the delta of the Niger for 40 or 50 miles in their large canoes. Provisions, poultry, meat, and food are scarce, but the rivers abound in fish. Yams, kids, and dry fish constitute the food of the population, who, finding the trade in palm oil more lucrative than that in provisions, sell but little of the latter, and at high prices.

Vessels lie in the rivers at all seasons; they should be housed over with palm thatch, and have their holds thoroughly cleaned, particularly about the bilges and well, and if possible there should be ventilation along the bottom under the cargo; stoves should occasionally be lighted, and the whole vessel kept as dry as possible.

A trading vessel frequently takes three or four months to complete a cargo of palm oil. A quantity of salt should be procured at cape Verde islands on the passage from England; krumen obtained on the Kru coast, and water and provisions purchased at Fernando Po.

Palm-oil season.—The palm-oil season lasts from March to September, when it becomes scarcer, and is out of season; but, in fact, it may be, and is, obtained all the year round.

Trade.—Palm oil, palm kernels, and india-rubber, ebony, and ivory, are the principal exports; ebony is abundant about the Cross river, and

* See Admiralty chart:—River Benin to river Cameroon, No. 1,357; scale, $m = 0.12$ in.

camwood, which is used in the manufacture of a rich crimson dye, grows nearly all over the delta. Shea butter and beni seed are also exported.

Communication.—Steamships.—There is a regular service of steam vessels to Benin, Sapelli, Wari, Forcados, Akassa, Brass, Bonny, Old and New Calabar, and Opobo.

Telegraph.—From Lagos there is a telegraph line through Ogbosmostro and Ilorin to Jebba on the Niger, and from Jebba this line is continued to Lukoja through Egga. At Brass river there is a cable to Lagos and a cable to Bonny; at Bonny a cable to Cameroon, and to Princes island, St. Thomas and Gaboon.

Climate.—The rains usually commence at the mouths of the Palm Oil rivers in the latter end of May, and generally increase with strong S.S.W. and S.W. breezes during July and August; towards the end of September they gradually assuage. In July and August heavy squalls frequently prevail, and in these months the wind rarely shifts from S.W. more than a point or two to the southward; the rain is incessant for days except for an hour or two about noon.

In October the weather becomes more settled, with light land winds, and occasional showers of rain with moderate sea breezes in the daytime.

In December, January, and February is the dry season; sea and land breezes blow, and calm and hot sultry weather is experienced.

The temperature is very equable, seldom reaching above 90° in the shade, or falling below 65°, generally ranging during the 24 hours between 75° and 87°. The greatest danger to health occurs from catching cold; excesses of any kind in eating or drinking, and exposure to the direct rays of the sun, are also to be guarded against. By attending to these three injunctions it is not difficult to maintain a healthy condition. December, January, and February are considered to be unhealthy months at Old Calabar river.

The upper portion of the Opobo river is more healthy than lower down; above the mangrove swamps the climate is cool and it is free from mosquitoes and sand-flies.

During the survey of the Akwayafe river in 1890 every white man employed contracted fever, and this region is considered highly dangerous to white men at any season of the year, on account of the exceptionally unhealthy nature of the soil and country.

Sanitary precautions.—Special instructions, for the preservation of health, are issued for the guidance of officers and men employed in the rivers of the west coast of Africa, many of these instructions, applicable also to those stationed on the coast, are given below:—

- (a.) Only condensed water should be used for drinking purposes, but if, from any cause, such is not available, and other water has to be used, such should be invariably boiled.

See chart No. 1,357.

- (b.) Exposure to the sun and rain should be most carefully avoided, particular care being taken that neither the head nor the nape of the neck is left exposed to the sun's rays. Sleeping, exposed to the night dews, is dangerous, and sleeping on deck should be only when under the protection of an awning.
- (c.) Wet clothes should be changed with as little delay as possible.
- (d.) It is strongly recommended to shift into night clothing, consisting of dry flannel or blanket, before sunset, also to wear abdominal belts, made of two thicknesses of flannel, both night and day.
- (e.) The use of carbolic acid or other approved disinfectants.
- (f.) As a rule, no white man should sleep on shore.
- (g.) It is important to health that all those who must keep on deck during a tornado should be in blanket dress; for, notwithstanding a high temperature, the rain numbs the limbs at the time, and a chill follows. If stoves could be lighted below for a couple of hours after each tornado, and on every day during the rainy season, it would conduce much to general health.

THE CAMEROONS.—The German protectorate of Cameroons includes Cameroon river and the Cameroon mountains; the western boundary of the protectorate is the left bank of the Rio del Rey. The protectorate covers an area of 191,074 square miles.*

The chief feature in this territory is the lofty Cameroon mountain, which, rising to a height of nearly 13,000 feet within 14 miles of the coast, forms the most conspicuous object on the west side of the African continent.

The Cameroon river, so named by the Portuguese on account of the numbers of shrimps found in it, is more the receptacle of a number of minor streams; at 90 miles from the sea navigation is said to be obstructed by rocks.

The rainy season is the busy time with the traders, as they can then take their canoes up the creeks.

Flora and Fauna.—Mangroves grow on the half-submerged banks, pandanus and raffia palms on the lowlands, and higher up forests of large trees are matted together by a tangled network of tall creepers. The cultivated plants are cocoa nuts, oil palms, bananas, yams, ground nuts, sweet potatoes, manioc, and especially *colocasia*, the taro of the South Sea islands.

India-rubber is extracted from *Candolphia florida*, a species of creeper, about 200 feet long, which grows on the Cameroon mountains.

Large mammals have generally retired from the coastlands, but apes abound in the forests, and the elephant still lingers about the seaboard.

What is known of the fauna has been found to be extremely diversified. There are about 40 species of venomous and harmless snakes, and some

* See Admiralty chart:—River Cameroon with the Amba islands, No. 1,456; scale, $m = 0.7$ inch.

new species of tortoises, chameleons, frogs, toads, and fish. Every fourth year, in the months of August and September, the river and neighbouring estuaries swarm with little yellowish shrimps of a hitherto unknown *thälassina* species, so closely packed that they are caught in baskets.

The butterflies and beetles produce striking effects of colour, and there is a harmless *glossina* resembling the tsetse fly : spiders are scarce.

Population.—The population of the Cameroons protectorate is estimated at 4,500,000.

Products.—Palm oil, and nuts, ivory, ebony, and some dyewoods are exported, and a small quantity of coffee is grown.

Trade.—In 1896 the value of the imports amounted to £268,000, and of the exports, £198,000.

Ports.—The principal ports are Victoria and Cameroon.

Communication. — Steamships.—The British and African Steamship Company have a regular monthly service to Cameroon, and several steam vessels call at irregular periods.

Telegraph.—There is a cable between Cameroon and Bonny.

Climate.—The climate is somewhat similar to the Bight of Benin ; the rains, abundant in May, continue to increase till the end of August, and usually cease by the beginning of October. Vapours are very dense in November when the harmattan prevails.

Although the settlement of Victoria in Amba bay may be considered unhealthy, owing to the swamp close behind it, the anchorage appears to be quite healthy, and only two slight cases of fever occurred on board H.M.S. *Flirt* during her stay from 25th March to 20th April.

The adjacent mainland is nearly devoid of mangrove and swamp ; and as the land wind passes over the lofty Cameroon mountain, the night air is rendered cool and refreshing. Indeed, from the peculiarity of its situation, and from local circumstances, Amba bay will probably be found one of the most healthy positions on the west coast of Africa.

Land and sea breezes are experienced, the former during the night and the latter during the day.

The AZORES, or WESTERN ISLANDS, a part of the kingdom of Portugal, were discovered in the 15th century, and with the exception of the south-easternmost island (Santa Maria), are of volcanic origin, and may be considered to consist of a number of craters thrown up to heights varying from 35 feet to 7,613 feet, on an extensive ridge, 330 miles long, lying in a north-west and south east direction, and comprised within the parallels of 36° 55' and 39° 45' N. latitude, and the meridians of 24° 45' and 31° 20' W. longitude.

The archipelago, with the exception of Santa Maria island, that lies slightly south of the general direction, is subject to the most tremendous

See chart No. 1,456.

* See Admiralty chart :—Azores or Western islands, No. 1,950 ; scale, $m = 0\cdot07$ inch.

convulsions. Towns and villages have been destroyed, and submarine disturbances have caused islands and rocks to appear, though these sometimes have again disappeared.

Being generally mountainous the islands may be seen from a considerable distance, the summit of Pico being visible from a distance of 75 miles.

The islands derive their name from the fact of their abounding with a species of buzzard when first discovered. At that time they were generally thickly wooded, but now small plantations and orange gardens, with uncultivated patches of heath and scrub, cover a large portion of the surface.

There are three administrative districts: the east, central, and west; and the seats of government of these districts are at Ponta Delgada, in San Miguel, which is the principal town: Angra, in Terceira, and Horta, in Fayal. Three military districts, each under a governor, correspond with the civil districts.

Geology.—With the exception of Santa Maria, which contains some limestone beds, all the islands are composed exclusively of ashes, scorïæ, and lavas. Indications of upheaval are visible in Terceira, where the beach, although composed entirely of volcanic rocks, is, at certain points, strewn with boulders of granites, quartz, schists, sandstones, and limestones; and at Santa Maria fragments of gneiss are found, the origin of which is difficult to determine.

Flora and Fauna.—The original flora of the islands included not more than five trees, and about the same number of shrubs, but the hillsides were clothed with timber; now, however, large trees have disappeared from the heights and open tracts. The most remarkable of the woody plants on the elevated lands are the faya, or laurel, of the Canaries, and a species of Juniper (*Juniperus oxycedrus*) spoken of by the natives as a cedar.

Of late years a large number of species have been introduced from tropical and temperate regions, and, in the gardens of Fayal and San Miguel, the oak, beech, and lime mingle their foliage with the taxodium (cypress), tulip tree, araucaria, cedar, camphor, acacia, and the palms of both hemispheres. The most valuable forest trees introduced are the marine fir, the Japanese cryptomeria, the eucalyptus, acacia, cypress, and oak.

The animals and birds are similar to those found in Great Britain; and the islands are free from poisonous animals or reptiles; the fishes are of a mixed British and West Indian character; the insects are partly British, partly Spanish, and partly Portuguese. African locusts have occasionally alighted in swarms and devoured the crops.

Population.—The number of inhabitants amounts to about 260,000.

See chart No. 1,950.

Produce.—The vegetation is a mixture of that of Europe and the tropics, for instance, wheat and bananas, figs and cabbages, pine apples and potatoes, are alike abundant and good of their kind.

The soil of *Sau Miguel* is extremely fertile, and produces maize, which is the staple agricultural product, a considerable quantity being exported; wheat, broad-beans, haricots, a species of sweet potatoes, also fruit and vegetables are grown in great quantities, and there are several tea plantations. Oxen, sheep, pigs, and poultry thrive well. Of late years the orange trees have suffered from disease, and the quantity of fruit exported has greatly fallen off, but about 500,000 pine apples are yearly exported, the major portion to London. There are three distilleries for making alcohol from the sweet potato; the products are sent to Portugal and Madeira. Wine is produced for home consumption and there is a brewery. Flax is largely cultivated, and forms an important article of commerce; water and wood are abundant. The town of *Ponta Delgada* offers most of these resources.

Ports.—The principal ports are *Santa Cruz* in *Flores*; *Horta* in *Fayal*; *Praya* bay in *Terceira*; and *Ponta Delgada* in *San Miguel*.

Communication. — Steamships. — There are fortnightly steamers by the *Empresa Insulana de Navegacio* from Lisbon to *San Miguel*, *Terceira* and *Fayal*, and monthly by the same company, to *Graciosa*, *St. Jorge*, *Pico*, *Flores*, and *Santa Maria*.

Telegraph.—The Azores have telegraphic communication by a cable from Lisbon to *San Miguel*, thence to *Fayal*, *Pico*, and *Terceira*, and from *Pico* there is a branch cable to *San Jorge* and *Graciosa*.

Tides.—The course of the tidal wave which strikes the Azores is from S.W. by S. to N.E. by N., the rise of tide varying about one foot for every 100 miles, throughout the group; that is to say, at *Flores* the spring rise is $3\frac{1}{2}$ feet and at *Santa Maria* it is 6 feet.

Climate.—The chief climatic changes in the islands are due to the direction of the wind, and although the climate is generally unsettled and humid, it is equable and healthy. Southerly winds are accompanied by a warm and moist atmosphere, while those from the northward render it cool and dry.

Snow is rarely seen in the lower valleys, but hail often falls during winter storms, and rains are frequent in all seasons, but especially in winter, when westerly winds prevail. The rainfall diminishes from west to east; *Santa Maria*, the easternmost, being also the driest island of the group.

The changes of temperature are very slight, and the seasons follow each other without any marked transitions; the annual range of temperature, from season to season, seldom exceeds 14° Fahr., but the difference between the extremes of summer and winter temperature is about 50° Fahr.

For invalids San Miguel is considered by those who have tried both places to be preferable to Madeira, as in addition to the mildness of the climate it has both hot and cold mineral springs, which are highly spoken of as a cure for rheumatism and similar diseases, as well as affording considerable relief to consumptive patients.

The inhabitants of Santa Maria do not appear to be subject to severe internal diseases, but some of an external eruptive character are both widely spread and aggravated during the summer.

THE MADEIRA GROUP, a Portuguese possession, consists of the islands Madeira, Porto Santo, and the Dezertas, and is situated 340 miles from the coast of Marocco, between the parallels of $32^{\circ} 23'$ and $33^{\circ} 8'$ N. latitude, and the meridians of $16^{\circ} 16'$ and $17^{\circ} 17'$ W. longitude.*

Madeira is said to have been discovered in 1334 by an Englishman named Machim, who was wrecked on its shores; but more probably it was first seen by Portuguese navigators in 1419. At that time the island was uninhabited and covered with timber, from which latter circumstance it received the name Madeira. The island was settled by the Portuguese in 1421, and has since continued in their possession, except during the continental war which terminated in 1814, when it was occupied by the English, and restored to Portugal at the peace of 1814.

The characteristic features of Maderia are, its greater and general elevation, the number and picturesque outline of its mountains, the depth and grandeur of the ravines, the numerous mountain streams, abundance and purity of water, fertility of soil, extreme mildness and uniformity of temperature, and the excellence of its climate.

The government of Madeira is administered by a lieutenant-governor, who has almost absolute power.

Geology.—Although of volcanic origin, there are no craters to be seen on any part, except San Antonio, a mountain $1\frac{3}{4}$ miles west of Machico bay, on the south-east side of the island, which has a smooth shallow basin on its summit. The island is entirely occupied by igneous rocks ejected during successive marine eruptions, but the lavas are of great antiquity, and the basalts and trachytes, resting on a conglomeration of volcanic débris, have been eroded, by rains and torrents, to depths of several hundred feet below the original surface.

Flora and Fauna.—Owing to the mild climate of the Madeira group, and its proximity to the continents of Europe and Africa, the flora is very varied, consisting of tropical plants and species peculiar to the temperate zone. When discovered, the islands were covered with timber, and it is supposed that there were about 700 species of plants indigenous; since which several thousands have been added, and the violet and banana,

* See Admiralty chart:—Madeira, Porto Santo, and the Dezertas, No. 1,831; scale, $m = 0.5$ inch.

strawberry and mimosa, palm and conifer, guava and pear tree, may be seen side by side.

The larger trees, including the dracona, were all cleared by fires, some of which were burning for years, and, in all the low-lying ground, cultivated plants have replaced the old vegetation. Fields and orchards are found to the height of 2,500 feet; laurels and ferns so far as 5,350 feet, where also grows the *Oreodaphne fœtens*, which emits a particularly fœtid odour.

All the quadrupeds have been introduced; the marine fauna is mainly European, and the fishes are essentially Lusitanian, occupying an intermediate position between those of the British Isles and the Mediterranean.

Population.—The population of Madeira in 1890 was 95,112. The inhabitants are of a mixed race, principally Portuguese and Moors.

Products.—The cultivation of the island on its south side seldom extends more than from 2 to 2½ miles inland, and on its north side not to half that distance; but little cultivation is attempted at elevations exceeding 3,000 feet. The whole of the mountains above that height, which constitute so large a portion of the island, are left wild and uninhabited.

Below the elevation of 1,200 feet many of the most useful tropical plants, as the date, palm, guava, banana, and coffee plant are found, with numerous others peculiar to the warmer part of the temperate zone.

From the level of the sea to an elevation of 2,500 feet, the fruits and grains of Europe are raised, and nearly the whole of this district is covered with vineyards; the chestnut, which is extremely abundant, the beech, and other European trees, with the mahogany, grow on the mountains below the elevation of 3,400 feet, above which only pines, heaths, ferns, and grasses are found.

Sugar forms a very important agricultural product, but the quantity produced is scarcely sufficient for the consumption of the islands, and the wheat grown is only about one-sixth part of that required; maize is grown in very small quantities; bananas are cultivated for the English market; and of vegetables, potatoes, onions, and early French beans are the principal exported.

Embroidery and wickerworks are two important industries.

Agriculture is chiefly confined to the growth of the vine, the land being usually let in small holdings of 10 to 50 acres. Wheat, barley, maize, and rye are produced, but the crops produce on an average only about one third of the consumption. Fruits and vegetables grow with little trouble, and in great abundance and variety.

Wine is the most noted article of Madeira produce. The grape is not indigenous to the island, and is said to have been introduced from

See chart No. 1,831.

Crete, being carried from that island by order of the famous Prince Henry of Portugal, under whose auspices Madeira was settled by the Portuguese in 1421. Many other varieties of the grape have since been carried to the island, its mild climate and volcanic soil being especially suitable for their growth. The north side of the island, though sufficiently fertile, being so exposed to cold winds and fogs, is not so favourable to the culture of the vine as the south side, where all the finest growths are raised.

A good year's vintage of the wine produced in Madeira may be estimated at from 9,000 to 10,000 pipes; in 1898 the shipments of wine amounted to 6,216 pipes, a pipe being equal to 92 Imperial gallons. A considerable quantity of wine is shipped to Lisbon in transit to other countries.

Trade.—The principal articles of export are wine, embroidery, fruit, wickerwork, vegetables, &c., and import, coals, dry goods, maize, wheat, rice, &c. In 1898, the total value of exports was £307,597; that of the imports being £318,888; the total amount of coal imported was 98,598 tons, valued at £93,385.

During the year 1898, the number of vessels of all nationalities that entered Funchal was 883; of these 800 were steam vessels, 504 being of British nationality.

Fish are found in variety and abundance, the best being tunnies and eels. The sea around the shores of Porto Santo abounds with fish; one of the best fishing banks lies off the south extreme of Cima island.

Ports.—Funchal is the only port of consequence.

Communications.—Steamships.—Steamers of the following lines call at Madeira:—Union S.S. Company, Royal Mail; Castle S.S. Company, Royal Mail; weekly. Booth S.S. Company; Messrs. Forwood Bros.; Red Cross line and Hamburg South American S.S. Company, about every 10 days. African S.S. Company; British and African Steam Navigation Company; Prince Line; Woermann Company; Empresa Nacional, and Empresa Insulana, fortnightly; and Messrs. Allen Bros.; Société Générale de Transports Maritimes à Vapeur, and Chargeurs Réunis monthly.

Telegraph.—Madeira is connected with Europe by two cables to Lisbon, also by two cables with St. Vincent; thence by a cable to Bathurst, there connecting by cable to the northward with St. Louis, Tenerife, and Cadiz, and to the southward with the cape of Good Hope, and many intermediate ports on the west coast of Africa.

Climate.—The climate is mild and the temperature always moderate, with a very small range; the difference between February, the coldest, and August, the hottest, month, being generally less than 12° Fahr., the mean monthly temperature from December to May is 64°, and from June

See chart No. 1,831.

to November 72° Fahr. It is this equality of climate which constitutes the chief recommendation of Madeira to invalids, but the voyage from England should not be attempted by them before the middle of June, or later than the end of September. Spring is trying on account of the prevalent N.E. wind, and October is the first month of the rainy season of autumn.

The rainfall varies remarkably from year to year; the wettest month is December, and driest August.

The rainfall observed in the years 1895, 1896, and 1897 was 57·3, 26·7, and 26·1 inches respectively; the two latter years are stated to be about the average.

THE CANARY GROUP, consisting of seven principal islands and several smaller ones, is supposed to have been known to the ancients by the name of the Fortunate islands: they are comprised within the parallels of 27° 37' and 29° 24' N. latitude, and the meridians of 18° 10' and 13° 25' W. longitude, and have an area of 3,342 square miles, Tenerife, the most important, occupying a central position among the principal islands.*

These islands have acquired a great importance in late years, not only as a coaling station for the many lines of steamers bound to the cape of Good Hope, New Zealand, and South America, but from their yearly increasing export of market garden produce: and lying in the track of all vessels trading by the Atlantic route between Europe and the southern hemisphere, are likely yearly to become a more important coaling centre. In 1898, 346,480 tons of coal, imported by British firms alone, were supplied to vessels from the various depôts in the islands.

The islands are under Spanish laws, Santa Cruz, in Tenerife, being the residence of the governor-general, whilst the administration is directed by an *audiencia* in Gran Canaria. The military force consists of 25,000 men.

Geology.—The Canary islands are of volcanic origin, and amidst the lava beds, covering the greater part of their surface, the primitive or sedimentary formations occupy a very small space, most of the headlands are formed by eruptive rocks, and in the western islands of the group the basalts, trachytes, and obsidians are generally of great antiquity.

Since the rediscovery of the islands, about the end of the thirteenth century, discharges of lava have been confined to the islands of Lanzarote, Palma, and Tenerife; from the sides of the peak of the latter island some eruptions have taken place during the last century.

Volcanic eruptions.—The summit of the cone of Tenerife is an extinct volcano, but some eruptions have taken place during the last century from the sides of the mountain.

* See Admiralty chart:—Santa Cruz to cape Bojador, including the Canary islands, No. 1,229; scale, $m = 0\cdot07$ inch.

Flora and Fauna.—Two-thirds of the plants of the Canary islands, are European species, and laurels, oaks, chestnuts, and other acclimatised, trees, occupy the middle slopes of the western islands; the native pine is one of the most remarkable of conifers, and at an altitude of 6,600 feet on the peak of Tenerife several peculiar plants occur.

In the eastern group, and in the low lying districts of the other islands, a flora of Libyan aspect corresponds to an African temperature, and here flourish the fleshy plants, euphorbias of cactus form, and such exotics as palms, nopals, and bananas; in the Veneguera valley, Grand Canary, the euphorbias, large as fig trees, form extensive forests, and *Euphorbia canariensis*, and *Euphorbia balsamifera* are found. The *Dracænus draco*, so named from its curious form and blood-red sap, has attained a large size in Tenerife.

In addition to the animals introduced from Europe, there are others constituting distinct varieties, and it is uncertain whether they are indigenous or were introduced by the Berbers; amongst these are large goats and a vigorous breed of camels. Some of the birds also differ from those of Europe, such as the red partridge and canary. There are no snakes, but large indigenous lizards, centipedes, and scorpions abound.

The marine fauna is more European than African, and there are even several American fish; the cod rivals in quality that of Newfoundland.

Population.—The population of the Canary group in 1895 was estimated at 295,300, probably almost wholly of Spanish origin, but mingled in blood by intermarriage with the aborigines, or the Quanches, who have disappeared as a distinct race. A pestilence swept away the few survivors in 1494.

Products.—Tomatoes, potatoes, and bananas, are extensively grown, also sugar, wheat, and cochineal, but an improved system of irrigation is much required. Wine is made, and cattle are raised, and it is proposed to make large plantings of carob trees, the bean pods of which would furnish food supply for cattle in time of scarcity.

Trade.—Wine, spirits, tomatoes, potatoes, bananas, and cochineal are the principal articles of export; in 1898 the total value of tomatoes, potatoes, and bananas exported was about £220,000. The total value of the exports is about £1,100,000. The imports consist of cotton and woollen manufactures, blankets, coals, beer, &c., and are valued at about £1,200,000. In 1895 the number of vessels entered at various ports of the Canary islands was 4,020, with an aggregate tonnage of 5,598,146 tons. The vine is cultivated on all the islands; but the best wine is made at Tenerife. All the islands afford excellent fruit, vegetables, and game in abundance.

Fisheries.—Large numbers of boats are employed in fishing operations, and about 30,000 quintals of fish are taken annually, the quintal being equal to 101½ lbs. avoirdupois.

See chart No. 1,229.

The legal weights used are those of the metric system; 1 kilo being equal to 2·2046 lbs., 50 kilos are generally reckoned as one hundred-weight, and 1,000 kilos as one ton.

Ports.—The ports are Santa Cruz in Palma; Port Gomera in Gomera; Santa Cruz, the capital of the group, and Puerto Orotava in Tenerife; La Luz harbour and Las Palmas in Grand Canary; and port Naos in Lanzarote.

Communication.—**Steamships.**—Three steamers monthly to Genoa by Compagnia a Voloce. The African S.S. Company's steamers call at Grand Canary every week and those of the British and African Company every fortnight; these steamers also call at Tenerife weekly. The Castle line of steamers call fortnightly and those of the Compania Trasatlantica of Barcelona monthly at Las Palmas. There is regular communication between the islands by steamers of the Compania de Vapores Correos Interinsulares Canarios, from Grand Canary to Tenerife, Palma, Gomera, Hierro, Fuerteventura and Lanzarote.

Telegraph.—The Canary Islands are connected at Tenerife with Cadiz and St. Louis; the branches among the islands being to Palma, Grand Canary, and Cruces.

Climate.—In general the climate is healthy, the heat being tempered by the elevation of the islands, and the prevalence of north-east and west winds. November and December are the only rainy months; in January the weather is generally fine, and in February the tops of the mountains become covered with snow. The islands are increasing in favour as a health resort.

THE CAPE VERDE GROUP consist of 14 islands, belonging to the kingdom of Portugal, and were discovered in the middle of the 15th century; they are situated about 320 miles west of Cape Verde, lying between the parallels of 17° 12' and 14° 46' N. latitude, and the meridians of 22° 40' and 25° 22' W. longitude, and have an area of 1,490 square miles. The islands are of volcanic origin, generally mountainous, rocky, and badly supplied with water.*

The islands are governed by a governor-general appointed by the Portuguese Government; St. Jago, the principal and south-eastern island of the group, contains the town of Ribeira Grande, formerly the capital, but the governor-general now usually resides at Porto Praya in the same island.

Those portions of the islands that are not composed of rock and lava are sandy and barren, but fruits, both European and tropical, are grown in abundance; the scarcest commodity is fresh water.

Geology.—The islands, although probably altogether of volcanic origin, seemingly belong to an older geological epoch than the Azores or

* See Admiralty chart:—Cape Verde islands, No. 336; scale, $m = 0\cdot15$ inch.

Canaries. St. Antonio and Fogo consist altogether of scorïæ and lavas, but in the other islands crystalline rocks, granites, and syenites are found, and fine metamorphic marbles and sedimentary rocks occur. Mayo is remarkable for the relative extent of its non-igneous formations. None of the craters have been in eruption since the discovery of the islands, and earthquakes are rare except in Brava.

Flora and Fauna.—The indigenous flora of the islands is not well known, and the distance from Europe, and inaccessible nature of many of the districts, have not favoured extensive introduction, but no trees appear to be indigenous. There are a few baobabs, and other Senegambian trees, also dracœna, eucalyptus and tamarisks.

The aboriginal fauna also presents few distinct species; the monkeys and wild boars are not separate varieties, and cattle, rabbits, and rats have been introduced. The guinea hen is extremely common; there is a separate variety of puffin, and a large lizard (*Macrosclincus coctei*), elsewhere unknown, which lives on a vegetable diet.

Fish, turtle and prawns of different species are very plentiful, but some of these may be poisonous.

Population.—The islands are not all inhabited; the population consists of a mixed race of Portuguese and negroes, numbering 111,000.

Trade.—The chief articles of commerce are salt and orchilla, the former is obtained at all the islands, but especially at Sal; the annual export of salt is about 15,000 tons; vegetables and fruit are grown.

Ports.—The ports are Porto Grande in St. Vincent; and Porto Praya in St. Jago.

Communication. — Steamships. — There is regular mail communication by steam vessels once a month to Southampton and Lisbon; Madeira and Lisbon; Brazilian and River Plate ports, and the Portuguese settlements on the west coast of Africa. Steamers arrive from, and leave for, Europe almost daily.

Telegraph.—There are two cables from St. Vincent to Madeira; two cables to Pernambuco, and one cable to Bathurst; there is also a cable between St. Vincent and St. Jago.

Climate.—The months of August, September, and October form the wet and most sickly season, when strong gales from the southward tornados, and calms are experienced. The remainder of the year is known as the dry season. The healthiest months are from November to July.

Occasionally the annual rains fail, among the Cape Verde islands, causing destructive famines, and the harmattan sometimes brings large quantities of sand from the desert, which is deposited on the islands in the form of impalpable dust; these dust storms may occur at any time except perhaps in the months of August and September.

Porto Grande is said to be very healthy, but fever of a mild type exists at certain seasons. It is reported to prevail amongst the natives after the rains in September, and is said by some authorities to be very prevalent amongst Europeans in the harmattan season.

LIGHTS.—The intrinsic power of a light should always be considered when expecting to make it in thick weather. A weak light is easily obscured by haze, and no dependence can be placed on its being seen.

The power of a light whose candle-power is not given can be estimated by remarking its order as entered in the Light list, and in some cases by noting how much its visibility in clear weather falls short of the range due to the height at which it is placed. Thus a light placed at 200 feet above the sea, and only recorded as visible 10 miles in clear weather, is manifestly of little brilliancy, as its height would permit it to be seen over 20 miles if of sufficient power.

CAUTION.—Buoyage.—The positions, colours, and distinguishing marks of the buoys on the west coast of Africa may be generally considered as unreliable. Owing to changes in channels and shoals, the positions of the buoys require alteration from time to time, and those exposed to the sea or the influence of tidal streams frequently break adrift. A buoy which has drifted from its moorings may seriously mislead, if assumed as being in position.

CAUTION.—Pilotage.—Steam vessels, passing through narrow creeks where the turns are sharp, should, in addition to sounding the steam siren frequently as a warning, have a look-out man at the masthead to give notice of any approaching vessel.

WINDS AND WEATHER.—Variable winds prevail in both hemispheres beyond the polar limits of the trade winds. In the North Atlantic ocean, when the sun is in the northern hemisphere, the prevailing westerly winds are S.W. and W.S.W.; if, on the contrary, the sun is in the southern hemisphere, they are more frequently experienced from W.N.W. and N.W. This latter period is that of gales and bad weather between North America and Europe. In the English channel, easterly winds prevail in February, March, April, and part of May; during the other months of the year westerly winds predominate.

In the South Atlantic ocean the westerly winds vary from N.W. to S.W., but they are changeable and irregular. In the zone between the parallels of 28° and 35° S. the winds are extremely variable; but those which are most frequently met with are from N.E. through North to N.W.; and from N.W. through West to S.W., principally during June, July, and August.

Trade winds.—The average polar limit of the north-east trade wind in the Atlantic ocean extends to the parallel of 27° N., while that of the south-east trade lies on a line between the cape of Good Hope and

the islands of Trinidad and Martin Vaz, in about 20° S. latitude. These limits vary about 3° N. or S. with the declination of the sun. The equatorial limits of these winds generally vary in the same manner; that of the north-east trade travelling from 12° N. in August to 2° N. in February, on the meridian of 26° W.; while that of the south-east trade changes from 3° N. to 1° N. between the same months and in the same longitude.

The equatorial limit of the north-east trade wind verges, according to the season, more or less towards the equator; but it seldom passes southward of it; the south-east trade wind, on the contrary, occasionally extends as far as 5° N. Between the equatorial limits of the north-east and south-east trade winds extends the zone or belt of calms and light-air named the "Doldrums." This zone is narrowest in February and broadest in August, averaging 100 miles in the former month and 300 miles in the latter.

When the sun is in the southern hemisphere, and at its greatest distance from the equator, the direction of the north-east trade wind is more from the northward, and stronger winds are experienced than at any other time. If the sun be in the northern hemisphere the north-east trade is more from the eastward.

During the northern summer the trade wind region is sometimes entered before reaching the latitude of Madeira; this occurrence is, however, exceptional. Between the months of November and March the variable winds of the temperate zone occasionally extend so far south as lat. 20° N.

The north-east trade wind varies considerably in its direction when under the influence of the land, and to the eastward of long. 25° W., when within 400 or 500 miles of the coast of Africa, it blows more from the northward than it does in the open ocean. Between the Canary and Cape Verde islands during the northern summer months, it blows from N.N.E. to N.E. for half the time; and during the winter months, from January to March, the wind in the neighbourhood of Cape Verde occasionally draws to the N.W. and West.

It will be seen that the most favourable time for crossing the line will be from December to June, when the passage will be less interrupted by calms, squalls, and variable winds.

Sometimes the north-east and south-east trade winds meet, generally somewhere about the meridian of 28° or 33° West, where a vessel may pass in a squall from one trade to the other.

South-west monsoon.—In the gulf of Guinea, so far north as Cape Palmas, the prevailing winds are south-west and southerly; between the latitude of Cape Palmas and that of Cape Roxo south-westerly winds prevail between June and September, and north-easterly winds during the other months of the year; in the latitude of Sierra Leone this south-

west wind extends from the shore to long. 32° W. in the middle of the northern summer.

During the fine season, land and sea breezes prevail with great regularity near the coasts and islands lying within the tropics.

Harmattan.—On the west coast of Africa, between cape Verde and cape Lopez, a very dry, easterly wind, known as the harmattan, sometimes blows in December, January, and February; it occasionally lasts five or six days, and has been known to continue as long as a fortnight, blowing with moderate force. It is always accompanied by a thick haze, which is experienced as far as 12 or 15 miles from the shore.

From Sierra Leone northward its direction is from E.S.E.; on the Gold Coast N.E., and at cape Lopez N.N.E.

Tornadoes.—Tornadoes are violent gusts of wind peculiar to the west coast of Africa; they are of short duration, usually blow off shore, and are generally most frequent at the commencement and termination of the rainy season. Their approach is generally indicated by a well-defined and regular arch of dark clouds, from which thunder and lightning constantly proceed; a dense white cloud in the centre of the arch foretells a powerful blast.

During the lull which follows a tornado, and while the wind is resuming its usual moderate force (a period sometimes of three hours), a perpendicular stream of rain descends, and is attended by rapid peals of crashing thunder, with scarcely an interval between them, and by vivid forked lightning which seems to proceed from all quarters at once.

Directions.—Under sail.—In order to meet the first burst of a severe tornado, it is in general prudent to bear up from the indicated quarter—to furl all sails, including awnings, strike top-gallant masts, bar in ports and scuttles, and hoist the fore-staysail, for it is essential that the vessel should not receive the first burst on her broadside.

At anchor.—If at anchor (the best condition in which to receive a tornado), furl awnings until the wind has expended itself, and keep the fore-staysail ready to cast the vessel in case of parting; then loose and slope awnings directly the wind ceases, in order to carry the succeeding deluge of rain to the water-ways.

Seasons.—As a rule the rainy season on that part of the coast north of the equator commences when the sun crosses the zenith from south to north, and terminates when it re-crosses the zenith; the remainder of the year comprising the fine season.

Marocco.—On the coast of Marocco during the winter months the prevailing winds are from North and N.N.E.; winds from the westward occasionally blow with considerable force, and are frequently accompanied by thick and long continued fog.

During summer the prevailing winds are from N.N.W. through North to E.N.E., and blow generally freshly; between the Canary islands and the mainland N.N.W. winds are stronger than elsewhere.

Mogador.—N.E. winds with fine weather prevail from March to December; the breeze generally falls during the night sometimes to a calm; the sea becomes smooth, but rises again in the morning; during the remaining three months the winds are variable and the weather stormy.

East and S.E. winds are rare; they are locally known as the *simoom*, and are dry and hot, and while they last, which is fortunately of short duration, great discomfort is felt.

Southerly winds are usually gentle and accompanied by fog; these winds generally veer to N.W. before dying away.

Gales usually blow from W.S.W., and are preceded by a falling barometer, the horizon is overcast with heavy dark clouds which move rapidly; a fine rain commences and is soon followed by the gale.

Cape Bojador to the Gambia river.—The prevailing winds on the coast between cape Bojador and the river Gambia are, during the fine season, from E.N.E. to N.N.W., veering gradually during the day from the former to the latter direction; this daily variation is not experienced when farther from the coast than about 30 miles; the land breeze at night is felt when near the shore.

During the rainy season (end of June to middle of September) S.W. and West winds occasionally blow with violence, but are not of long continuance; these westerly winds are generally light, and frequently interrupted by calms, particularly on the parallel of St. Louis.

Fogs are common on the coast at all seasons of the year.

Rollers occasionally set in with great violence and the sea has been known to break in a depth of 9 fathoms.

Arguin island.—In the vicinity of Arguin island the prevailing winds are from E.S.E. to N.E. between September and April, during which period various kinds of fish are abundant.

Senegal river.—The winds veer between East and North during the greater part of the year, and in the rainy season (July, August, and parts of June and September), as the storms generally come from the S.E., those vessels at anchor in the road, which cannot depend on their ground tackle, will find it easy to get under way. The S.W. winds which succeed being generally feeble, they may return to their berths when the gale is over.

Occasionally, during the fine season, strong N.W. winds are experienced, but they are of short duration.

Easterly winds are most prevalent during January and February, being succeeded by northerly winds in March.

Sea breezes are regularly experienced during the dry season.

Dakar.—The prevailing winds are North and N.E. At the commencement of the dry season (November to May inclusive), dry tornadoes, which consist of heavy gales unaccompanied by rain, blow with great violence chiefly from the South, but during the rainy season the tornadoes, also from the South, are neither so frequent, nor of such violence as those experienced on the coast further to the southward.

Gambia river.—Severe tornadoes, of short duration, occur in July.

Kasamanze river.—Winds from E.N.E., N.N.E., and N.N.W. prevail during the dry season at Kasamanze river (October until May); variable winds, chiefly from a westerly direction, prevail during the remaining months of the year.

Moderate rains and calms precede the rainy season (May–October); tornadoes blow at the commencement and end, but are most frequent at the former period. Heavy rains are experienced during July and August. Thick fogs are of common occurrence at all seasons of the year.

Cape Roxo to Isles do Los.—The fine season on the coast comprised between cape Roxo and Isles do Los lasts from the middle of November until the beginning of May; the rainy season from the middle of May to the commencement of November. In the fine season light East and N.N.E. winds are experienced during the morning when near the coast; the sea breeze seldom commences before noon, and often blows freshly.

Calms at this season are frequently experienced when southward and eastward of the Bijouga islands.

Fogs during the morning, lasting until about noon, are of daily occurrence during the latter part of autumn on the coast of Pongo, as well as among the Bijouga islands.

Rain is almost continuous during the months of July and August.

Tornadoes are experienced during April and May, and from the middle of September until the end of October.

The harmattan blows from S.E. to N.E. during December, January, and February.

Cape Verde to Sierra Leone.—On that portion of the coast between cape Verde and Sierra Leone the prevailing winds during the rainy season (June to September) are from the southward and westward, with squalls from S.W.; these prevailing winds are usually light.

During the fine season southerly and westerly winds are also occasionally experienced, veering to N.N.W. in the afternoon.

Near the land (except during the winter season) land and sea breezes prevail with great regularity.

Harmattan.—The harmattan season commences with December, or rather earlier than off the Gambia, and extends through December, January, and February; occasional intervals of clear weather, accompanied by a refreshing sea breeze from the N.W., afford a respite to the oppressive effects of this wind. Nor does the harmattan blow uniformly either in the same direction or with the same strength; for it ranges through eight points of the compass from N.E. to S.E., and however fiery at the commencement, declines, after the first month, to a comparatively light breeze.

Tornadoes.—The tornadoes precede the rains, sometimes by as long as a month, and again return after the rains have ceased. They blow from East to S.E. and towards the end of the tornado season occasionally from the southward with great fury, but seldom last more than three hours.

Rollers.—The surf on this coast is always extremely heavy, and the rollers sometimes curl in 5 fathoms and break tremendously in 3 or even 4 fathoms. They may generally be expected at the latter part of the rainy season, and chiefly about the time of new moon; therefore, during this season, vessels should avoid anchoring in shallow water in unsheltered places, especially in the vicinity of a large river, as the ebb tide tends greatly to increase the danger.

Isles do Los.—During the dry season land and sea breezes are experienced; the calm interval between, with intense heat, sometimes lasting for 3 or 4 hours, from 10 or 11 a.m. during the month of May, but in winter S.W. to West winds blow fairly constantly during the day. From April to June and September to December, tornadoes are of almost daily recurrence, generally commencing from E.S.E., veering through South to S.W., in which direction they terminate, the barometer giving no warning.

Sierra Leone to cape Three Points.—On the coast between Sierra Leone and cape Three Points the rainy season commences in May and lasts until September, with generally a partial break about the middle of August. During this period of the year fresh W.S.W. winds are experienced, accompanied by a heavy swell.

Tornadoes are encountered in April, May, and October.

The harmattan season begins in December and continues during January and February; when this wind is not blowing, southerly and westerly winds prevail, accompanied by fine weather.

Banana islands.—From December to April inclusive is considered the dry season, when rain is very occasional, and during this season the winds are usually from a northerly direction, but occasionally fresh from the southward; it is generally calm at night.

During the rainy season the wind is generally strong from the southward after heavy rain during the night; calms usually succeed the next day.

During the rainy season there are occasional fine days, and sometimes three weeks elapse without rain.

Tornadoes are worst during September to November inclusive, and usually occur at night; during May and June they generally occur during the day.

Sherbro river.—During the survey of the river Sherbro, from February to May, 1895, the prevailing winds were from the northward and westward, generally light during the forenoon and freshening in the afternoon, with occasional squalls from the N.E. at night; these latter, most frequently accompanied by lightning and rain, appeared more prevalent in the neighbourhood of Banana islands than further up the river. The weather was usually hazy during the above months, but a few occasional very clear days were experienced.

Cavally.—The rainy season commences in May, lasting until the middle of August, when what is known by the natives as “the little dry season” begins, and lasts till nearly the end of September, after this the rains again set in and continue till the end of November or beginning of December. Tornadoes blow from the eastward during April and May, and throughout December to the middle of January; those in the earlier parts of the year are not heavy.*

Bight of Benin.—The prevailing winds in the bight of Benin are from S.W. and West; lasting gales of wind do not occur. Occasionally, in the western arm of the bight, during June, July, and August, there is scarcely any rain, and but few squalls.

The coolest month of the year is June, when also strong breezes prevail from the S.W., with the thermometer occasionally down to 77° Fahr.

Tornadoes give ample warning of their approach, are of brief duration, and generally blow off shore; they may take place at any period of the day or night from the beginning of March to the end of June, also during October and November.

In April and May tornadoes may be expected at intervals of 48 hours, and twice sometimes on the same day. In June and July they occur almost daily or nightly, but are not accompanied by such violent wind, in August and September the weather resolves itself into almost continuous rain, with strong sea breezes and heavy swell from the south-west.

They generally commence from the S.E. and draw round through east to N.E.; but this is by no means certain, as they have been experienced blowing right on shore. They have been known to begin at East and

* Remark book, Navigating Officer, H.M.S. *Thrush*, 1892.

draw round to South, and they have also been experienced from the westward. When the sea breeze is strongest the tornadoes are found to be most violent. Hard squalls from the S.E. are also occasionally encountered, which have not the characteristics of the tornado (the black arch and vivid lightning gathering to leeward), but are not the less dangerous.

The barometer gives no indication of an approaching tornado, and maintains its uniform quiescent state, which in this region varies but a tenth above or below a height of 30 inches throughout the year; but the thermometer quickly falls 5° as the tornado approaches, and continues to indicate its cooling effects for some hours after.

In October the weather gradually clears up, leaving November, December, January, and February the most settled and healthy months of the year.

Nun river.—Akassa.—Fogs are common, their intensity being greatest in June and July and least in May and September. Dew is deposited from November to May, most copiously during February to April. Unusual visibility of distant objects occurs between the heavy rain. Harmattan dust is exceedingly dense during November and December, and in these months sand-flies and fire-flies are abundant during the nights.*

Niger river.—On the middle Niger tornadoes commence in March, and increase in frequency during April, May, and June; in July and August the rain is heavier, but the strength of wind less. They blow from all quarters, but are perhaps more frequently experienced from the S.E. at Bajibo; from the S.W. at Jebba; and from the N.E. at Lukoja. The harmattan is experienced during the months of December and January.

Oil rivers.—In October the tornadoes commence, being violent at first, they continue when the harmattan is not blowing, until the month of May, occurring most frequently and being most violent between the middle of April and the middle of May; they come from N.E. and East, and off the Old Calabar river occasionally blow directly on shore from S.E.

Harmattan.—During the season when this dry easterly wind may be expected (December to February) dense mists, locally known as smokes, prevail, which are so dense that nothing can be seen at more than a cable from the vessel, and mariners approaching the coast have no resource but to anchor. In March, April, and May the weather is clearer, and occasionally, especially after a tornado, very clear, when the high land of Fernando Po and Cameroon mountain may be seen from a distance of 100 miles; but even during these months a vessel may frequently approach to within 7 or 8 miles of the land without seeing it. The nights at this season are very fine.

Occasionally the harmattan blows continuously for days together.

* "Meteorological Observations," by Frank Russell, Esq., F.R.G.S., F.R.Met.Soc.

Cameroon river.—The following is compiled from 3 years' observations at Cameroon :—

In the morning the winds are very variable in direction, seldom south-westerly, and of little or no strength; mean force for 3 years, 1-0. The afternoon winds are, almost invariably, south-west, drawing more westerly between December and March, and moderate or fresh breezes are frequently felt; mean force, 3-4. Calms and light south-west winds prevail in the evening; mean force, 1-0. Seven instances of greater strength than a fresh breeze were recorded. A strong breeze in March and a fresh gale in April from N.E.; strong breezes in March and May and a moderate gale in April from East; and strong breezes in February and May both from S.W.; most of these occurred in the evening.

Fogs are very common in the morning, but are rarely experienced later in the day.

Azores.—The Azores are situate in, or near to, a fairly constant area of high barometric pressure, which has a very slight diurnal range; they are remarkable for the prevalence of strong winds, and throughout the year the number of calm days scarcely on an average amount to more than ten.

During summer the prevailing winds are those from N.E. and East but these are not steady, unless they commence to blow well from the eastward and rise gradually.

No continuous fine weather should be expected except between the middle of June and the end of September, during which period calms are at times experienced.

During winter the prevailing winds are strong, and blow from N.W., West, and S.W.

South and S.E. winds are accompanied by violent squalls, as also are those from N.W. S.W. winds generally bring rain.

S.W. gales usually veer to N.W., and then moderate.

Gales are also experienced with both N.E. and S.E. winds, the latter being generally accompanied by a clear sky.

In the vicinity of Corvo and Flores islands, the weather is very changeable at all seasons of the year, and even in summer fresh N.W. and S.W. winds are often experienced.

When the summit of Pico is enveloped in clouds, stormy weather and rain generally follow.

Great clearness of the atmosphere usually precedes a southerly gale.

Barometer.—During the passage of the centre of a gale over the Azores the barometer usually falls to 28·50, and rises one-tenth for every 10 miles of its removal; so that the distance from the centre of an approaching gale might be roughly estimated from the excess of the height of the barometer above 28·50.

Fog.—Thick fogs often occur among the Azores during winter.

Madeira.—January is sometimes a very boisterous month, with S.W. winds; more generally N.E. winds prevail. Rain is frequently experienced on the north side of the island, while in Funchal bay it is fine and clear.

During February there is also sometimes a prevalence of southerly winds, but more frequently northerly, shifting at times suddenly to East and E.S.E., so that no dependence can be placed upon them. These sudden shifts of wind are frequently followed by gales of short duration, accompanied by thunder and heavy rain.

In March the prevalent winds are from N.W., and occasionally blow very hard, though they are not dangerous to vessels at anchor in Funchal bay, but they occasion a high surf on the beach, which renders the transfer of goods very difficult. Sometimes in this month there are heavy falls of snow on the mountains.

During April the weather is unsettled, occasionally strong winds continue until the middle of the month, though it is more usually fine from its commencement; the mountains are occasionally capped with snow in April.

May, June, and July have generally clear nights and cloudy days, with regular land and sea breezes near the land and steady N.E. winds in the offing.

August and part of September are fine though hot months—L'Este or Siroc winds are occasionally experienced; these winds blow from the East sometimes in considerable strength for 6 to 9 days consecutively, accompanied by a dry and cloudless atmosphere.

In November and December fine weather is generally experienced, the prevailing wind being from N.E., with occasionally thick weather.

Gales are principally to be apprehended in November and December, commencing a few points on either side of South, gradually veering round to the westward and terminating at N.W.

On the 16th October 1842 Funchal was visited by one of the most severe storms that had occurred since the flood of 1803, when upwards of 400 persons were swept into the sea; and had the deluge of 1842 occurred at night, as was the case in the former catastrophe, there is no doubt but hundreds of persons would have been drowned. However, few lives were lost, except in the distant parishes, where several hundreds of persons were carried into the sea. In Funchal bay, out of six vessels that were caught at anchor by this hurricane, only one escaped destruction.

Land and sea breezes.—During summer, when the land and sea breezes prevail, it requires the exercise of some judgment to get to the anchorage off Funchal, and the time of day must be borne in mind. The sea breeze from S.W. to W.S.W., and sometimes more westerly, sets in generally from 9 to 10 in the morning, and gradually dies away towards evening. About 9 or 10 at night a gentle land wind springs up, which in

its turn subsides towards the morning, leaving an interval of 4 to 5 hours calm before the sea breeze again sets in.

Rainy season.—In October, towards the middle of the month, the periodic rains may be expected, which continue generally about fourteen days. They frequently commence with strong S.E. winds, which veer to S.W. and round to N.W., when the weather clears and becomes fine. St. Martin's summer succeeds this rainy season, and extends usually over an equal period of time, being accompanied by N.E. winds. There is, however much irregularity about St. Martin's summer, for it is sometimes delayed until December.

Canary islands.—In the archipelago of the Canaries, situated near the northern limit of the north-east trade, the prevailing winds are from N.E. to North. From the middle of November to the latter part of January the trade winds are sometimes interrupted by violent gales from S.E.; these, however, are of short duration, and the swell which accompanies them is felt 2 or 3 hours in advance; they are, perhaps, of more frequent occurrence in the latter month. With S.E. winds there is generally much rain and thick fog, but the weather clears as soon as the wind shifts to the northward. During the same period (middle of November to middle of January) gales from S.W. and N.W. are also experienced; the latter are the more violent, but generally of short duration.

Palma island is said to be more subject to westerly winds and rain than any other of the Canary group, and to be frequently enveloped in fog.

Occasionally, when the trade wind is light, it is replaced by a southerly wind, accompanied by a suffocating heat resembling that of the harmattan.

In the principal bays there are regular land and sea breezes, but the former never extends far from the shore; it commences about 10 p.m. and dies away about 9 or 10 a.m., when there is a calm interval until the sea breeze sets in. In the middle of the channels between the islands the prevailing North or N.E. wind continues both night and day.

During the summer months, N.E. winds generally blow, which, being obstructed by the height of the mountains, leaves a calm space some miles to the leeward of the islands.

When the N.E. wind is very fresh it frequently occurs that, to leeward of, and near to, an island, a wind from the opposite direction is experienced, locally known as the *embata*; this is more or less fresh according to the strength of the trade wind.

With S.E. winds the bays exposed to them are very dangerous; Las Palmas bay in Gran Canaria island is the only anchorage which is safe during December and January. The summer usually breaks up early in November, and at that time strong S.E. and S.W. winds are experienced,

accompanied by rain and lightning; these winds are preceded by a distinct fall of barometer and extreme visibility of distant objects.

When the winter sets in early, and the rains commence in September, it has been noticed that the S.E. winds are not so strong.

The prevailing winds in Rio strait are from North and N.N.E.; occasionally the trade wind draws through from E.N.E., or towards S.E., when the gusts from the south shore are strong. In winter, S.W. winds sometimes blow with great strength.

Barometer.—At the Canary islands the barometer is very sensitive; a rapid rise indicates an approaching easterly wind, while a fall is the precursor of West or S.W. winds.

Cape Verde islands.—From January to March the trade wind blows from N.E. to North and N.N.W.; the harmattan is also felt. From April to June the direction of the trade wind is between N.E. and East, of less force as it veers eastward. From July to September the trade is varied by winds from S.E. to S.W., squally, with fogs, tornadoes, calms, and rain. In October winds blow from S.E. to S.W., with squalls and fogs. During November and December the trade-wind blows from N.E. to North, the harmattan is also experienced during these months. Calms extend for a considerable distance to leeward of each island. Near the shores of the islands the alternation of land and sea breezes is experienced.

Haze.—During the months of December, January, and February these islands are frequently enveloped in a dense haze, which is not at all times attended with moisture, but by fine dust or sand that is probably blown across from the Sahara desert. In these months great caution is necessary when making the land; in some cases ships have been dangerously near to the shore before it has been sighted.

Rollers.—During July, August, and September, rollers are of common occurrence, being generally heaviest at full and change of the moon.

BAROMETER.*—In the intertropical regions the range varies from 0·4 to 0·2 inch, and in the neighbourhood of the equator it seldom exceeds 0·15 inch, this small change being due in great part to a regular diurnal variation. The average movement of the barometer within the tropics being thus confined within small limits, any interruption of the law may be deemed a warning of the approach of bad weather. The fall of the barometer in hurricanes ranges from 1·0 to 2·0, and even 2·5 inches;

* See small charts, on Admiralty wind and current charts for Pacific, Atlantic, and Indian oceans, 1872 (republished January 1879), showing the Isobars and Isotherms for the different seasons of the year; also, the Barometer Manual for the use of Seamen, issued by the Meteorological Council, London.

the rapidity of the fall and the depression of the mercury increases as the centre of the storm approaches.

In the northern hemisphere the effect of the veering of the wind on the barometer is according to the following law :—

With East, S.E., and South winds the barometer falls.

„ S.W. winds the barometer ceases to fall and begins to rise.

„ West, N.W., and North winds the barometer rises.

„ N.E. winds the barometer ceases to rise and begins to fall.

The connection between the height of the barometer and the direction of the wind, according to a law discovered by Professor Buys Ballot, and bearing his name, is expressed in the following rule :—“ If the face be turned to the wind, the low barometer will be on your right hand.”*

This rule applies to the northern hemisphere, but must be reversed in southern latitudes.

CURRENTS.—The general drift current of the North Atlantic striking the land about cape Ortegal in Spain divides into two branches, one named the Portugal current flowing southwards, the other flowing eastwards along the north coast of Spain, and following the shore of the bay of Biscay to the north and north-west. This latter current, however, depends mainly upon the strength and direction of the winds to the westward of Spain, and no dependence can be placed in its being felt by the mariner ; as instances are recorded of wrecks north-westward of cape Ortegal drifting to the westward.†

When, however, strong or long continued westerly winds have prevailed, a considerable stream may be felt, which, circling round the bay after passing Chaussé de Sein, flows across the entrance of the English channel towards cape Clear. This is known as Rennel's current. It is now fairly well established that this is only an occasional current so far as navigation is concerned, but as it may attain a rate of 1 or $1\frac{1}{2}$ knots an hour, the knowledge of its possible existence, coupled with the known strength of the tides in the vicinity of Ushant, should induce great caution in making the island, especially if there has been no means of verifying the latitude.

The Portugal current.—It may be taken for granted that the whole surface of the Atlantic Ocean between the parallels of 40° N. and 35° N., and from a distance of 300 miles from the shore to 390 miles west of it, is in motion towards the strait of Gibraltar and the African

* The law usually given, “ If the back be turned to the wind the low barometer is on the left,” has been reversed in the text above, as the seaman usually looks to windward and not to leeward.

† See Admiralty monthly current charts of the Atlantic Ocean, Nos. 2,951 to 2,956.

coast; this direction of current is experienced when 50 miles west of Madeira, westward of which it sets to the south-westward.

From cape Finisterre the current generally flows to south-east and south along the coast of Portugal as far as cape St. Vincent, its greatest velocity being between the months of July and October; it then runs easterly toward the strait of Gibraltar, but, during the months of March, April, July and August, in an area extending about 200 miles west of cape Finisterre, and south to lat. 41° N., the current circles to the eastward and north-east running past the cape, in the latter direction, at rates sometimes attaining 20 and 30 miles a day.

In the centre of the strait of Gibraltar, the surface current sets continually to the eastward, the maximum rates of 40 and 50 miles a day being experienced in the months of March and April, and September and October respectively. Off the entrance to the strait, and west of long. 10° W., the current generally sets south to south-west, and attains, during the months of May and June, rates of from 30 to 40 miles a day.

Between cape St. Vincent and the neighbourhood of Rabat the rate of this general easterly current, towards the strait of Gibraltar, varies from no appreciable current to 30 miles per day; on the coast of Spain the direction is south-easterly, and on the coast of Africa, it has at times a tendency to the north-eastward.

From cape St. Vincent to the Canary islands the current within 100 miles from the coast flows to the south-westward, at rates of from 10 to 30 miles a day, following the bends of the shore; among the Canary islands it is irregular.

From the Canaries to the Cape Verde islands it generally sets from South to S.W., with velocities of from 10 to 30 miles a day, being variable according to the direction, duration, and force of the wind, and sometimes there will be no current.

Inshore currents.—Northward of north cape Blanco the current generally sets to the south-westward at the rate of about half an knot an hour; north-west of cape Cantin it usually has the same direction with a velocity of about $1\frac{1}{2}$ knots an hour, but a set to the south-eastward at the rate of $1\frac{1}{2}$ knots an hour has been experienced.

From May to August, in the vicinity of south cape Blanco a current setting to the north-west at rates of from 10 to 30 miles a day has been experienced.

Between Mogador and cape Bojador the current, between the shore and a position about 50 miles seaward of it, runs in the direction of the coast, to the southward and westward, so that its course may be safely inferred from the bends of the shore. Its greatest strength is usually found at a distance of from 3 to 6 miles from the land,

gradually decreasing both inwards and outwards; its average rate within that belt is from half to three-quarters of a knot an hour, so far as cape Juby, but during the months of December to February, east and north-east sets, of from 10 to 35 miles a day, have been experienced, and inshore at Mogador in the same months the current sometimes set to the northward; but farther seaward it always sets to the south-westward.

In the offing between Mazighan and Mogador a set of 2 knots per hour to the S.S.E. has been experienced in November.

The southerly current which prevails along the coast of Marocco is not felt when abreast of Agadir till at the distance of 6 or 7 miles from the land, being deflected by the projection of cape Ghir.

From Wadi Shibika the coast curves outward, and the current, which hitherto has nearly followed the direction of the shore, here strikes it obliquely, rendering this the most dangerous part of the coast between capes Spartel and Bojador, and fully accounting for the numerous wrecks which have occurred there, the timber from which is used by the inhabitants both for firewood and materials for building their huts. The swell is almost invariably from the north-west, and therefore sets directly into the bight, so that it is almost impossible for a sailing vessel embayed there to work off; but here, in the month of June, currents have been found setting north-east and north.

Off cape Juby, owing to the conformation of the coast, and from being compressed by the Canary islands, the velocity of the current somewhat increases, and it has been reported that it frequently runs to the south-west at the rate of 6 knots round the cape Juby; during the stay of H.M.S. *Espiegle* it was running between 2 and 3 knots an hour.

Off cape Bojador it flows at less than a knot an hour, and, so far as could be observed, pursues its steady course uninfluenced by any change in the direction of the wind.

At 4 miles W.N.W. from cape Bojador the current has been observed to set S.W. with a velocity of $1\frac{1}{4}$ knots an hour. In April, while the H.M.S. *Sylvia* remained at anchor off the cape, a weak current ran continuously to the southward.

Off cape Corveiro the strength of the current along the shore is nearly a knot an hour, but farther seaward it is much less.

Along the western coast of Arguin, during the fine season, the current generally sets to the southward, but in the month of January, and from July to October a northerly set has been experienced. In July 1830, the wreck of the French frigate *La Meduse* drifted 90 miles in 13 days, and was found at 45 miles from the shore, nearly on the meridian of the place where she was lost.

Between Arguin and Senegal river the general direction of the current is along the coast from north to south, so far as the mouth of the river,

but in May, June, and November it has been found setting north-west, and in September and October to the north-east, sometimes attaining a rate of 30 miles a day in the latter direction. (*See Tidal streams, pages 205, 214.*)

The prevailing currents between the river Senegal and cape Verde usually follow the direction of the coast to the southward in the same manner as those already mentioned, but a northerly current is not uncommon, and from July to October an east or north-east set may be found, these sometimes attaining a rate of 20 miles a day. (*See also Tidal streams, page 216.*)

Off cape Manuel, the current separates into two branches; one sets towards Red cape, the other takes an easterly direction, passes south of Gorée island, sets over towards the eastern side of the bay, turns northward and westward, and following the trend of the shore flows back into itself through the channel between Gorée island and Dakar point.

The Guinea current is a stream current running to the eastward along that part of the African coast comprised chiefly between cape Roxo and the bight of Biafra, extending southward to the 3rd and 2nd parallels of North latitude. Its western limit can be traced at all seasons of the year as far as the 23rd meridian of West longitude, but in the summer and autumn months (July to November), an easterly current extends as far west as the meridian of 53° W.; this is probably an expansion of the Guinea current proper, or a counter equatorial current.

The greatest velocity of the Guinea current is experienced off cape Palmas, and between it and cape Coast Castle; in the month of June it sometimes attains a rate of 85 miles a day. The space separating the Guinea and equatorial currents is generally limited, thus presenting the remarkable feature of two well-defined streams running in exactly opposite directions side by side. Their courses continue thus parallel to each other and to the land for above 1,000 miles; and according as a vessel wishing to proceed along the coast in either direction, is placed in one or the other current, will her progress be aided from 40 to 50 miles a day, or retarded to the same amount. (*See Equatorial current, page 51.*)

The temperature of the Guinea current is generally above 80° at all seasons of the year.

In the harmattan season (December to February) the Guinea current near the land in the bight of Benin is checked, and in-shore a westerly set is felt. Heavy tornadoes have a similar effect in checking the Guinea current.

Cape Verde to Sierra Leone.—On this coast, extending 150 to 200 miles from the shore, the currents change with the seasons.

From June to September, with squally S.W. winds, N.E. or northerly currents, with rates from 10 to 40 miles a day are experienced. From October to May, with N.E. and northerly winds, a south-easterly current is experienced.

Between cape Verde and the Bijouga islands in the months of July and August an easterly set, sometimes attaining a rate of 30 miles a day, may be experienced.

Sierra Leone to cape Palmas.—The current on this part of the coast is influenced by the wind. Between May and October it sets to the N.W. with winds south of S.W., and to the S.E. with winds west of S.W.; in November there is generally a current setting N.W.; from December to May a current setting S.E., the latter having rates of from 10 to 40 miles a day.

Inshore currents.—Between Sierra Leone and cape Palmas the currents along the coast are, during the rainy season, influenced entirely by the wind. When the breeze is fresh, a current of at least 2 miles an hour may be expected; if the wind is south of S.W., the direction will be N.W.; if to the west of S.W. an easterly or S.E. current running strongly may almost be depended upon; and with a fresh S.W. breeze, in August, a set of $1\frac{1}{2}$ miles an hour has been experienced. Between November and the middle of January the set appears to be generally to the westward at the rate of half a knot an hour. From the middle of January to May the current may be expected to be found running to the S.E. at the rate of nearly one mile an hour.

During the rainy season, at the distance of a few miles from the shore at cape Palmas, an easterly set of 3 knots an hour has been experienced.

In April 1880, H.M.S. *Firebrand*, during an 8 days' passage between Sierra Leone and cape Coast had very light winds and experienced but a slight current to the westward at a mile off the shore.

In June 1881, H.M.S. *Briton* experienced a set of 64 miles to the E. by S. in 24 hours, during spring tides with full moon; when rounding cape Palmas under stream and sail while making a passage from Sierra Leone to cape Coast Castle.

Near cape Three Points the current is very variable both in strength and direction; H.M.S. *Barracouta*, in August 1873, experienced a current setting to the eastward, at the rate of 3 knots an hour, when close south of the cape. H.M.S. *Goshawk* experienced a strong current setting inshore in February 1884 and again in September 1885, when passing cape Three Points. At cape Coast Castle the current, which generally runs to the eastward at the rate of a knot per hour, frequently turns to the westward for a few hours after a heavy tornado. A westerly current was felt in January and February 1878, after several days continuation of light winds.

Bight of Benin.—With the exception of the tidal influence off the opening of Lagos, there is only the current to affect a vessel, when proceeding east or west along the western division of the bight, and its velocity varies from 10 to 45 miles a day, being generally weaker in October and November. This current rounds cape St. Paul and sets to the north-east, parallel to the coast line for about 25 miles; it then gradually assumes the E.S.E. trend of the shore for the next 180 miles till abreast of the termination of the sandy beach near Ajimo, and under ordinary circumstances, except during the harmattan season, without any inshore eddy.

From March to June this easterly current brings patches of sargasso or gulf weed (*Fucus natans*), the only sea-weed occurring in the bight: its delicate stalks, currant-sized leaves, and light brown berries may be seen in parallel lines drifting from the south-west, the patches averaging $1\frac{1}{2}$ miles long by a quarter of a mile wide; they extend to within 25 miles of the shore, and are observed so far to leeward as Lagos.

CAUTION.—During the harmattan season (December to January) the current inshore occasionally sets to the westward with a velocity of about one knot an hour; and when westerly winds have been blowing freshly for three or four days, and thus pressing a superabundance of ocean water against the leeward arm of the bight, a reaction takes place, and a westerly current will be produced lasting for 12 and sometimes 24 hours. In such circumstances, if a cruiser be intent on keeping her position at night, it will be prudent to drop a boat in order to ascertain the direction of the surface current, and always to make a free use of the stream anchor.

Attention to these fluctuations in the set of the current is especially necessary along the leeward arm of the bight, when within the influence of the river tides, or when in less than 12 fathoms water.

Between cape Formosa and Old Calabar the general direction and strength of the current is easterly, at the rate of about one mile an hour throughout the year, excepting during the harmattan season, when the direction is changed to W.S.W.; a heavy tornado will sometimes change the set of the current for a day or two, or occasionally, when strong winds cause the water to accumulate at the head of the bight, the current will set for a few days to the westward; in October, off cape Formosa, the current has been found to be setting N.N.W., at the rate of 34 miles per day, for three days after a tornado.

Sailing vessels, therefore, bound to Bonny river, if overtaken by night, should either anchor or work to windward until the morning; for if once to leeward, especially during the rains, a dull sailing vessel will have great difficulty in getting again to windward.

Currents in the vicinity of the islands.—Azores.—Near the Azores the currents are irregular, and generally weak, but sometimes attain a velocity of 20 miles per day, caused probably by the Gulf stream expending itself in their neighbourhood.

Salvage Islands.—The general set of current near Salvage islands is to the S.S.W. and S.S.E. at rates varying from 12 to 24 miles per day.

Canary islands.—The general direction of the current amongst the Canary islands is south-west. Off the island of Gran Canaria the current appears to set to the southward, almost directly through the channels, with an uniform rate of about half a knot an hour, though perhaps somewhat stronger off the headlands. On the south-west side of Gran Canaria, during the summer, the current sets to the westward at the rate of half a knot per hour.

Cape Verde islands.—The Cape Verde islands lie in the track of the North African current, which sets down upon them in a south-westerly direction at a mean rate of about half a knot per hour, being influenced more or less by the prevailing wind; the eastern islands of the group, viz., Sal, Bonavista, and Mayo, more especially feel the force of this set, the amount of which is occasionally very uncertain, and several wrecks have been caused by disregarding it. Great caution is therefore necessary when navigating in the vicinity of these islands.

Between St. Antonio and St. Vincent islands a current frequently sets to the north-eastward; this current is also experienced between Bird island and the shore of St. Vincent.

In the channel between St. Antonio and St. Vincent islands the current was observed to be tidal. During neap tides the surface water ran north, three hours after the tide commenced to rise, and ran for five hours at the rate of one knot an hour; it is, however, affected considerably by the trade wind. *H.M.S. Challenger*, 1873.

In beating through the strait between St. Antonio and St. Vincent islands, *U.S.S. Chase* was favoured by a current of from half to three-quarters of a knot an hour, and it is stated that the current sets to the eastward, in the strait, when the tide is flowing at Porto Grande, and westward when ebbing, but this latter current runs for a shorter period and has less strength than the easterly set.*

Equatorial current.—The Equatorial current in its course between the continents of Africa and America, may be considered chiefly as a “drift” current, formed of water brought from a cooler region by the south-east trade wind. It may be said to commence in the neighbourhood of Anno Bom island, or immediately south of the Equator, between the

* Lieutenant S. P. Edwards, *U.S.S. Chase*, 1896.

2nd and 8th meridians of East longitude, although from this locality a continuity of the northerly drift along the coast of south Africa, as well as from the river Congo, may be traced. The surface temperature in its eastern part is several degrees less for a great part of the year than the adjacent Guinea current, affording evidence of receiving waters from a colder source.

The Equatorial current appears to attain its greatest volume and velocity during the season of the northern summer. From the African coast to about the 15th degree of West longitude the maximum strength, 85 miles a day, has been observed in May and June, and during this period its direction is more regular, being West (true); westward of that meridian, at successive later periods, or between July and October, it is probably subject to irregularities in strength, depending on the winds.

The northern boundary, or, rather, the definite line of separation between it and the Guinea current, has been well traced in the space extending from the meridian of Greenwich to 23° W.; and is found to vary little at the several seasons of the year; for example, in the 20th West meridian, the "line of separation" in October and November is in 5° N., in March and April in 2° N.; in the 5th degree of West longitude the "line of separation" appears to be generally constant in 2° N.; and the current has a north-west direction.*

Approaching the African coast, Anno Bom island is considered to be at all seasons in the Equatorial current, Princes island in the Guinea current, and St. Thomas, situated nearly midway between the two, as within the influence of one or the other current, according to the seasons. (*See* Guinea current, page 48.)

From Anno Bom island to the meridian of 15° West, the following are the average surface temperatures of the Equatorial current:—

December to March - 78° to 82°	July to October - 72° to 75°
March to July - 82° to 72°	October to December - 75° to 78°

Westward of the 15th meridian the surface temperatures at the several seasons lessen materially in their annual range, and the Equatorial current gradually loses its earlier features of being a cold water stream at one particular season of the year.

EFFECTS OF REFRACTION.—Navigators should constantly bear in mind that the extraordinary refraction produced by the heated atmosphere along the whole coast of western Africa is a continual source

* Early in June 1887 H.M.S. *Landrail*, when on her passage from Sierra Leone to St. Paul de Loando, found the Equatorial current to be running strong to the north-west at from 60 to 80 miles to the northward of the limit of the current marked on the chart; southerly winds of considerable force were experienced at the time.—Commander D. Crofton.

of error, not only in observations for latitude, but also in chronometric longitudes; and one against which the greatest care should be exercised as the altitudes of the sun may be too little or too great. Observations, made in the day, should be verified by altitudes of stars and planets taken at night.

When making a landfall, or endeavouring to recognise a headland by means of the latitude, the same cause leads to a very serious deception; for this excessive and ever varying refraction, sometimes amounting almost to a mirage, renders it difficult to make a correct estimate of the distance of the land. In this case the lead should be the guide, as a bank of soundings of considerable breadth extends from most parts of western Africa; or, should any extent of coast be in sight, cross bearings or angles may fix the position of the ship.

The four point, or other change of, bearing of an object on shore, at each extreme of a short distance measured by the log, may give a close approximation to the real distance of the vessel from the land, but at times the distant shore will appear alarmingly close to the vessel, and at others the really near land will appear removed to such a distance, as to impose upon the most practised and experienced eyes.

COAL SUPPLY.*—Coal to the extent of 500 tons or more is kept in stock at the under-mentioned places situated in the area comprised by this book :—

Azores :—Fayal, Terceira, San Miguel.

Madeira :—Funchal.

Canary islands :—Tenerife and La Luz harbour.

Cape Verde islands :—St. Vincent, Porto Praya.

West coast of Africa :—Tangier, St. Louis, Dakar, Sierra Leone, Lagos, and Akassa.

Coal in smaller quantities might be obtained at the following places :—

Mogador, Bathurst, Nunez river, Konakri, Axim, Bonny, Old Calabar, and Cameroon.

The amounts generally kept in stock and facilities for coaling will be found under the headings of the several places.

BRITISH CONSULAR STATIONS.—**Marocco.**—Tangiers, Consul and Vice-Consul; El Araish, Vice-Consul; Dar el Beida, Consul and Vice-Consul; Mazighan, Vice-Consul; Mogador, Vice-Consul; Rabat, Vice-Consul; Safi, Vice-Consul.

Liberia.—Monrovia, Consul and Vice-Consul, the former residing at Sierra Leone.

Niger Coast protectorate.—A Consul and Vice-Consuls.

* See Admiralty Coal and Telegraph Chart No. 1,188.

Azores.—San Miguel, Consul; Fayal, Vice-Consul; Flores, Vice-Consul; Graciosa, Vice-Consul; San Jorge, Consular Agent; Terceira, Vice-Consul.

Maderia.—Consul and Vice-Consul.

Canary islands.—Tenerife, Consul and Vice-Consul; Palma, Vice-Consul; Las Palmas, Vice-Consul; Puerto Orotava, Vice-Consul; La Luz harbour, Consular Agent.

Cape Verde islands.—St. Vincent, Consul and Vice-Consul; St. Jago, Consular Agent.

PASSAGES.—ENGLAND TO THE CAPE OF GOOD HOPE.—**Full-powered steam route.**—As direct as possible. Give a wide berth to Ushant and cape Finisterre (remembering that the current from the Atlantic sets right on to the coast), and thence steer direct for and through the Canary islands, and proceed along the coast of Africa, skirting, as near as circumstances will permit, the shoals off it until off cape Palmas, and from thence direct to the Cape.*

The following places, where coal can also be obtained, are in the track mentioned above, or nearly so :—Vigo, Lisbon, Madeira, La Luz harbour, Sierra Leone, and St. Paul Loando.

The distances from Plymouth are :—To Vigo, 550 miles; Lisbon, 770; Madeira, 1,210; La Luz harbour, 1,410; Sierra Leone, 2,700; St. Paul Loando, 4,680; and the cape of Good Hope, 5,840 miles.

An auxiliary steam vessel would follow the sailing route, but encountering a foul wind on leaving England, steam should be used, if the wind be not too strong, to obtain a good offing to the W.S.W. until well able to weather cape Finisterre, and on losing the N.E. trade steam should again be used to pass through the doldrums into the S.E. trade. Cross the equator at all times of the year in about 23° W.

The distance from Plymouth by this route is about 7,450 miles, but it will vary much at different times of the year.

Sailing route.—A vessel on leaving the English channel should at once make westing, as the prevailing winds are from that direction.

With a fair wind, from the Lizard, a W.S.W. course should be steered to gain an offing in longitude 10° or 12° W.

If the wind should be from the westward keep on the track which enables most westing to be made to get a good offing, and keep clear

* See Admiralty charts.—Track chart for full-powered steam vessels, No. 1,077; track chart for vessels with sail and auxiliary steam power, No. 1,078; North Atlantic ocean, general, No. 2,059; North Atlantic ocean, eastern portion, No. 2,060a; South Atlantic ocean, general, No. 2,208; South Atlantic ocean, eastern portion, No. 2,202a; also Admiralty Pilot charts for Atlantic ocean, 1875 (corrected to 1878).

of the bay of Biscay, even standing to the north-westward until well able to weather cape Finisterre on the starboard tack. By making a long board to the westward nothing is lost, as the wind will generally be found to veer, so that a change of wind will be favourable and even permit a vessel to pursue a course with a free wind; whilst if embayed in the bay of Biscay, any change of wind to the westward would necessitate beating to windward against the current.

A vessel from Liverpool should pass north or south of Ireland, as most convenient, considering the direction of the wind at starting.

In passing cape Finisterre, give it a wide berth, as the current from the Atlantic usually sets right on shore there.

From long. 10° or 12° W. a course should be shaped to pass Madeira at any convenient distance. In the winter months it is preferable to pass westward of it, for the strong westerly gales which occur in November, December, and January, produce eddy winds and heavy squalls eastward of the island.

From Madeira pass to the westward and just in sight of the Cape Verde islands, as the winds are stronger and steadier to the westward than to the eastward of them.

In considering where to cross the equator it is necessary to bear in mind that if a vessel crosses far to the westward there will be a less interval of doldrum to cross, but it may be requisite to tack to weather the coast of South America, and these crossings vary during the year, as the direction of the S.E. trade wind is more southerly when the sun is north of the equator than when south. The following is the result obtained by the Meteorological Office after examining a large number of journals from ships:—

After passing the Cape Verde islands:—

From January to April stand to the southward on about the meridian of 26° W., and when the southerly winds are met with keep on the tack which gives most southing and endeavour to cross the equator not west of 26° to 28° W.

In May do not cross west of 25° W.

In June and July, when the southerly winds are met with (probably in 6° N. in June, and 10° N. in July) keep on the starboard tack, so long as any southing can be made, until a fair amount of easting has been made, and cross the equator in about 25° or 26° W.

In August the requisite easting should be made with the first of the south-westerly winds, in about 10° or 12° N., and the equator crossed in about 23° W.

In September, as in August, but crossing the equator in about 25° W.

In October, also as in August, but the southerly winds will first be met in about 8° or 7° N., and the equator should be crossed not west of 28° W.

In November and December haul slightly to the eastward so as to cross 25° W. in about 6° N., and then take the tack which gives most southing and cross the equator not west of 29° W.

Equator to the Cape.—Having crossed the equator as recommended a vessel should stand across the south-east trade on the port tack, even should the vessel fall off to W. by S., for the wind will draw more to the eastward as the vessel advances, and finally to East at the southern limit of the trade. When in the vicinity of St. Paul rocks, astronomical observations should be frequently made, the current watched and allowed for, and a good look-out kept, as these rocks are “steep-to,” and can only be seen on a clear day from a distance of about 8 miles. The same precautions are necessary if passing westward of Fernanda Noronha, when approaching that dangerous reef the Rocas, on which a light was established in 1882. Vessels, in proceeding to the southward in the south-east trade, generally sight the island of Trinidad to test the rate of their chronometers, and to take a fresh departure. During the greater part of the year the south-east trade fails on a line drawn from the cape of Good Hope to the islands of Trinidad and Martin Vaz. This limit varies about 3° , according to the position of the sun.

A vessel, when to the southward of the south-east trade, will meet with fresh winds variable in direction. Those from N.E. through north to N.W., if accompanied by cloudy weather, often shift suddenly to S.W. or South, but sometimes the wind steadies between West and W.S.W. From Trinidad island a course should be shaped to the south-eastward to cross the parallel of 30° S., in about long. 22° W., and the meridian of Greenwich in about lat. 35° to 37° S., whence to the cape of Good Hope winds from the westward and southward usually prevail. After passing the meridian of Greenwich, a strong northerly current will frequently be experienced; and on nearing the land, when bound to Table bay, great attention is required, as there it will be found almost constantly running strongly to the northward, and, if disregarded, a vessel may have difficulty and lose time in reaching the bay. If bound to Simon's bay during the southern summer months, it will be better to make the land about cape Hangklip, as a strong current sets at that period across the entrance of False bay towards Cape point.

CAUTION.—Under any circumstances, at night, there is great difficulty in judging the distance of lights situated under high land. Therefore, the prudent course for a stranger to pursue when making Table bay is to keep off and on until daylight, sufficiently to the westward of Green point to prevent being becalmed near the land and set in upon the coast by the heave of the sea.

For full directions when making the land near Table Bay, the mariner is referred to “Africa Pilot,” Part II., 4th Edition, 1893, chap. IX.

CAPE OF GOOD HOPE TO ENGLAND.—**Full-powered steam route.**—The reverse of the outward route, described on page 54.

Auxiliary steam route.—Similar to the sailing route, but crossing the equator in about 20° W., and steaming through the doldrums.

An alternative route is direct from the Cape to the Cape Verde islands, and then running through the N.E. trade and passing near the Azores as in the sailing route. This would be about 300 miles shorter, but more steam would be required through the doldrums. From June to September the vessel might pass eastward of the Cape Verde islands, as south-westerly winds are then prevalent there.

Sailing route.—A good offing should first be obtained to the north-westward, as squalls from the N.W. and W.N.W. are not unfrequent near the coast, and have been experienced in both seasons. Then a course should be shaped for St. Helena, in cloudy weather getting on to its parallel some distance to the eastward of it, to avoid missing it, if going to call there.

From St. Helena a direct course may be steered for Ascension, passing it on either side, and crossing the equator between 25° and 30° W. (in July between 20° and 25° W., to ensure better winds). Then a northerly course should be made to reach the N.E. trade as soon as possible (in July and August crossing latitude 10° N. west of 25° W.), and run through it. The trade wind will probably be lost in about 26° to 28° N., and from 38° to 40° W., when westerly winds may be expected, and a course shaped for the English channel.

It is seldom advisable to pass eastward of the Azores, but should the wind draw to the N.W. when near them, the most convenient channel through them may be taken.

If easterly winds are experienced after passing the Azores, the vessel should still be kept on the starboard tack, as westerly winds will probably be sooner found.

ST. HELENA TO THE CAPE OF GOOD HOPE.—**Full-powered steam route.**—Direct both ways. Distance 1,700 miles.

Auxiliary steam and sail route.—Run to the southward on the port tack through and out of the trade, and then stand to the south-eastward, crossing the meridian of Greenwich between 35° and 37° S. Then keep between these parallels, as in the passage from England to the Cape, and make the Cape from the south-west.

CAPE OF GOOD HOPE TO ST. HELENA.—Direct for all vessels, but sailing vessels should, on leaving, get a good offing before

shaping a direct course, to avoid the squalls near the land ; and on nearing St. Helena, vessels should make it from the eastward on its parallel in cloudy weather, so as to avoid missing it.

ENGLAND TO ST. HELENA AND BACK.—Full-powered steam route.—The same as the track from England to the cape of Good Hope to below cape Verde and then direct. Distance from Plymouth, 4,210 miles.

The homeward route is the reverse.

Auxiliary steam and sailing routes.—Pursue the route to the cape of Good Hope (p. 54) to beyond the south-east trade, and then make sufficient easting to be able to enter the trade again and weather St. Helena, which should be approached from the south-east. As a rule, vessels should avoid going on the starboard tack, or decreasing their latitude, until St. Helena bears about N.E. by N.

From January to April another route, known as the northern route, is, by some authorities, deemed preferable ; that is, pass eastward of the Cape Verde islands and along the African coast until past cape Palmas, and thence, keeping in the Guinea current, pass close to St. Thomas island and, if in the month of March, endeavour (using steam in an auxiliary steam vessel) to reach about latitude 7° or 8° S. and longitude 4° or 5° E., from whence St. Helena will generally be fetched on the port tack ; but if in the months of June and early part of July it will probably be sufficient to get as far as 4° or 5° S. in the same longitude, as the wind then generally hangs more to the eastward.

In August and September, when S.W. winds prevail between Cape Verde islands and the mainland, sailing vessels used to stand, on the starboard tack, far enough to reach St. Helena with the trade.

The homeward route is the same as from the cape of Good Hope to England.

ENGLAND TO SIERRA LEONE.—Full-powered steam route.—This is the first half of the route to the cape of Good Hope described on page 54. The distance from Plymouth is 2,700 miles.

Auxiliary steam route.—The same as the sailing route, steam only being required to get a good offing to the W.S.W. on leaving, if with a foul wind, and again when losing the wind near Sierra Leone. If requiring coal it will probably be found most convenient to call at La Luz harbour, in Gran Canaria.

Sailing route.—Follow the route to the cape of Good Hope, described on page 54, so far as the Canary islands. From thence, from November to April, pass eastwards of the Cape Verde islands, keeping well over to the African shore after passing them ; but after May the

south-west monsoon begins to make and the north-east trade is kept longer by passing westward of the Cape Verde islands, so that, after losing the trade, Sierra Leone may be reached at once on the starboard tack.

If only going to Senegal river or Gorée, make the land near cape Blanco and then proceed along the coast.

SIERRA LEONE TO ENGLAND.—Full-powered steam route.—The reverse of the outward route.

Auxiliary steam route.—The same as the sailing route, but using steam from Sierra Leone into the trade wind.

Sailing route.—Stand to the north-westward into the north-east trade wind. Run through the trade, passing west of the Cape Verde islands, and then follow the route recommended for sailing vessels from the Cape to England.

GIBRALTAR TO CAPE VERDE ISLANDS.—Sail and steam route.—Pass through the Canary islands, between Tenerife and Gran Canaria. Distance, 1,560 miles to St. Vincent.

CAPE VERDE ISLANDS TO GIBRALTAR.—Full-powered steam route.—Pass east of the Canary islands. Distance, 1,570 miles.

Auxiliary steam and sailing routes.—Stand to the north-westward out of the trade and from about 30° N. go as direct as possible.

SIERRA LEONE TO ASCENSION AND BACK.—Full-powered steam route.—Direct. Distance, 1,000 miles.

Auxiliary steam and sailing routes.—After leaving Sierra Leone and clearing St. Ann shoals a vessel should run along the coast, within 50 miles of the land, until past cape Palmas, when an endeavour should be made to cross the equator between 3° and 8° W., and then, without making a tack, Ascension will be fetched, probably after a passage of 15 or 16 days from Sierra Leone.

During the month of November long-continued calms and a strong north-westerly current are experienced in the vicinity of St. Ann shoals.

A vessel from England to Ascension would take the route to Sierra Leone, pass by it, and then as above.

The return route is direct for all vessels.

ASCENSION TO ST. HELENA AND BACK.—Full-powered steam route.—Direct. Distance, 700 miles.

Auxiliary steam and sailing routes.—Run to the southward on the port tack, and when beyond the limit of the trade make easting and

re-enter the trade sufficiently far to windward to ensure weathering St. Helena.

As mentioned in the passage from England to St. Helena, vessels should avoid going on the starboard tack, or decreasing their latitude, until St. Helena bears about N.E. by N.

The return route is direct for all vessels.

SIERRA LEONE TO THE BIGHT OF BIAFRA.—

All vessels.—After rounding St. Ann shoal keep along the coast as far as cape Palmas and thence go direct. The following are the principal places on the route, with their distances from Sierra Leone :—Cape Palmas, 450 miles ; Cape Coast Castle, 850 miles ; Lagos, 1,140 miles ; Cape Formosa (neighbourhood of the oil rivers), 1,270 miles ; Fernando Po, 1,410 miles ; and Princes island, 1,360 miles.

Sailing vessels should be careful not to get to leeward of their port.

Coal can be obtained at Lagos, Akassa, (Nun entrance of Niger river), Fernando Po, and Gaboon river.

BIGHT OF BIAFRA TO SIERRA LEONE.—Full-powered steam route.—The reverse of the above.

Auxiliary steam vessels.—The same as the sailing route, but using steam, on leaving, until across the equator, and again on nearing Sierra Leone.

Sailing vessels.—From the northern part of the bight of Biafra (where the principal oil rivers are) vessels should stand south and, if possible, pass to the westward of Fernando Po, and cross the equator as soon as possible, unless the vessel can lie up as high as W.N.W. When southward of the equator stand to the westward in the equatorial current, and as westing is made the wind will be found to back gradually round to S.E. When in about 10° W. the equator may be recrossed and a course shaped for Sierra Leone.

From any place in the gulf of Guinea, eastward of cape Palmas, both sailing and auxiliary steam vessels should stand to the southward into the equatorial current, and then proceed as above.

BIGHT OF BIAFRA TO ENGLAND.—Full-powered steam route.—Direct to cape Palmas, then along the coast of Africa, through the Canary islands, and past cape Finisterre for the English channel. Distance from Fernando Po to Plymouth, 4,160 miles.

Auxiliary steam route.—As in the sailing route, but using steam on leaving until across the equator, and also through the doldrums.

Sailing route.—Stand to the southward of the equator into the equatorial current, and then make westing, as from the bight of Biafra to Sierra Leone. Re-cross the equator in about 20° W., and then, as from

the cape of Good Hope, run through the N.E. trade, and shape a course for the English channel.

ASCENSION TO THE COAST OF AFRICA.—Full-powered steam route.—Direct both ways. The distances are—to cape Coast Castle, 1,130 miles; to Fernando Po, 1,560; to the Congo river, 1,570 miles; and to the cape of Good Hope, 2,380 miles.

Auxiliary steam route.—As in sailing route, but using steam if necessary.

Sailing route.—From Ascension a sailing vessel should, on the starboard tack, fetch the coast of Africa in from 13 to 15 days, but at various points, from cape Lopez as far to windward as St. Paul de Loando, or even farther to the southward, according to the season of the year; in the month of May the wind hangs to the eastward all the way over, and a vessel will not weather Anno Bom island; generally, however, a good sailing vessel, carrying a press of sail, will fetch to windward of the Congo.

Two precautions are, however, requisite; first, not to go to the northward of 3° or 4° S. latitude; and secondly, not to bring the port of destination to bear to the southward of S.E. by S. (true): an occasional short tack, as the wind backs a little, may therefore be necessary, but the whole passage may sometimes be made with a free wind.

Bound to the cape of Good Hope, run through the trade on the port tack, and then proceed as from England to the Cape.

BIGHT OF BENIN TO ASCENSION.—Full-powered steam route.—Direct.

Auxiliary steam route.—Similar to the sailing route, but using steam until across the equator.

Sailing route.—Stand to the southward on the starboard tack, generally weathering St. Thomas island as far as the equator; then stand to the westward, taking care to keep in the equatorial current. Northing will at first be made, but the vessel will be pretty sure to come up as she proceeds to the westward.

From cape Coast Castle a vessel should also stand across the equator on the starboard tack, and then as above.

For vessels from the coast, south of the equator, the winds are always favourable, gradually backing from S.W. to S.E. as the island is approached.

ST. HELENA TO THE COAST OF AFRICA.—Full-powered steam routes.—Direct. The distances are:—to Sierra Leone, 1,570 miles; to Cape Coast Castle, 1,280; to Fernando Po, 1,480; and to the Congo river, 1,230.

Auxiliary steam and sailing routes.—Vessels will generally fetch as far to the southward as Benguela, except in May, when the S.E. trade has more easting in it and the lee current is strong. To all places northward of Benguela, therefore, the winds are favourable. They veer round from S.E. to S. and S.W. as the coast is approached.

COAST OF AFRICA TO ST. HELENA.—**Full-powered steam routes.**—Direct.

Auxiliary steam routes.—Vessels should pass close to St. Thomas island, and use their steam to reach about 7° or 8° S. and longitude 5° E., from whence St. Helena will generally be fetched on the port tack; but in the month of June and early part of July it will probably be sufficient to get so far as 4° or 5° S. in the same longitude, as the wind then generally hangs more to the eastward.

The small-powered steam vessels usually employed on the coast of Africa generally make this passage, from the bight of Benin, in 17 to 20 days.

Sailing routes.—From places north of the equator, vessels should keep in the Guinea current until in the bight of Biafra, and then work along the coast as far as the river Congo, from whence there will generally be little difficulty in reaching St. Helena by keeping on the port tack. From cape Palmas a vessel on the starboard tack will generally reach cape Lopez and often south of Anno Bom.

WORKING TO WINDWARD IN BIGHT OF BENIN.—**Auxiliary steam route.**—Direct for short distances. Otherwise, steam across the equator and make westing in the equatorial current.

Sailing route.—In working to windward in this bight, it is advisable to stand off on the starboard tack during the day, and inshore on the port tack by night, tacking should the wind veer towards the west. If going some distance along the Guinea coast it is advisable to stand across the equator and make westing in the equatorial current.

In the harmattan season (December to February) the Guinea current near the land in this bight is checked, and inshore a westerly set is felt.

TO THE SOUTHWARD ALONG THE COAST OF AFRICA.—**Full-powered steam route.**—Direct. The distances are:—From Fernando Po to the Congo river, 630 miles; river Congo to Loando, 200 miles; Loando to Mossamedes, 390 miles; and from the Congo to the cape of Good Hope, 1,800 miles.

Auxiliary steam route.—Direct along the coast, coaling, if necessary, at the Congo, Loando, and port Nolloth; or, if bound to the

cape of Good Hope, stand out and run through the trade and approach the Cape as from England (p. 56).

Sailing route.—Along the whole shore of the bight of Biafra vessels may work to windward with the land and sea breezes, anchoring when necessary to prevent being set northward by the current, especially during April and May, the season of calms and tornadoes.

From cape Lopez to the Congo a vessel should maintain a good offing, only approaching the shore to take advantage of the land breezes, which begin to blow at, or a few hours before, sunrise. In February, and sometimes in October, the sea breeze is so well to the westward as to enable vessels to lie along the coast on either tack, but during May the wind blows steadily along the coast from South and S. by E., night and day, with a northerly current of a knot an hour.

To cross the Congo stream either keep 200 miles off the coast or keep in anchoring ground, the latter preferred. The usual course is to beat along shore as far as Red point (the northern point of the Congo estuary), keeping on the bank of soundings, in order to anchor if the wind falls light, and stretching across when the sea breeze has well set in.

From the Congo to St. Paul de Loando, vessels should anchor every night when the sea breeze falls light, so that they may weigh with the first of the land breeze and continue on the port tack until about 1 p.m., when they should tack, and by the time the sea breeze fails good progress will have been made to the southward.

From Loando to Great Fish bay, when in the neighbourhood of cape Palmerinhas, as the current sets to the northward with considerable force, a good stretch off the land for 50 or 60 miles will enable the vessel to weather the point; it seldom answers to work along shore. Do not get away from the land more than 50 or 60 miles, as beyond these limits the sea breeze declines in force and draws more to the southward, which would necessarily cause a loss of ground on the inshore tack, besides which the advantage of the alternate land and sea breezes, which are almost invariably experienced closer inshore, would be lost.

To the southward of cape Negro there is no difficulty in working to the southward if due advantage be taken of the variations of the wind, and the tacks arranged accordingly. As rollers are frequent, the shore must be given a good berth.

To the southward of cape Frio northerly winds may be expected from May to August.

If going to the cape of Good Hope, stand off and run through the trade, and approach the Cape as when bound from England (p. 56).

CHAPTER II.

AZORES, OR WESTERN ISLANDS.

 VARIATION IN 1900.

Santa Maria.— $23^{\circ} 25'$ W. Fayal.— $24^{\circ} 0'$ W.

Flores.— $24^{\circ} 40'$ W.

Decreasing $3'$ annually.

AZORES, or WESTERN ISLANDS, distant about 800 miles from the coast of Portugal, are nine in number, and consist of three groups, with clear channels between them. (For general description, *see* Chapter I., page 23.*)

The North-west group includes the islands of Corvo and Flores separated from the centre group by a clear channel 120 miles wide.

The centre group consists of Fayal, Pico, San Jorge, Graciosa and Terceira islands.

The South-east group is composed of San Miguel (St. Michael), the largest of the islands, the north-west extreme of which is separated from the south-east extreme of Terceira, by a navigable passage 75 miles in width; and of Sta. Maria (St. Mary) island, 43 miles S.S.W. from San Miguel, with Formigas rocks lying north eastward of it.

CORVO ISLAND, the northern of the Azores, is separated from the north extreme of Flores island by a clear channel 9 miles wide.†

The island consists of a single extinct volcanic mountain, and is about 9 miles in circuit, elongated in a north and south direction; the crater, $3\frac{1}{4}$ miles in circumference, occupies all the north-west portion of the island, and the highest part of the ridge is 2,548 feet high; at the bottom of the crater are two lagoons 1,277 feet above high water.‡ The number of inhabitants in Corvo was 806 in 1890.

* *See* Admiralty chart :—Azores, or Western islands, No. 1,950; scale, $m = 0\cdot07$ inches.

† *See* Admiralty chart with views :—Corvo and Flores islands, No. 1,946; scale, $m = 0\cdot5$ inches.

‡ *See* plan on chart No. 1,946.

Pesqueiro point.—The south extreme of Corvo island is sharp and well defined, with some detached rocks extending 2 cables from it, and shoals of 3 and $4\frac{1}{2}$ fathoms lying 3 cables south-east of it; on the south side of this point landing can be effected, and on the east side is situated the fishing village of Rosario, in a small bay. The west side of Corvo island is without indentations and extends, in a general N.N.E. direction, for about 3 miles to Torrais point.

Oeste point, which presents the appearance of low earth cliffs descending in one or two terraces to the sea, lies midway between Pesqueiro and Torrais points, and projects slightly from the line of coast; in the bight between Oeste point and Pesqueiro point is the conspicuous Sugar-loaf rock, and about three-quarters of a mile south-west of Oeste point is situated a low rock known as Ilheo de Mulha.

Torrais point, the north extreme of Corvo, is remarkable, rising steeply from the sea to the edge of the crater; north of the point, distant $1\frac{1}{2}$ cables, is a sunken rock, and when rounding it the water should not be shoaled to less than 25 fathoms.

Norte point, lying E. $\frac{3}{4}$ S., distant four cables, from Torrais point, is an inaccessible rock, 368 feet above high water, which projects 150 yards at right angles to the line of coast; its northern part forms an overhanging cliff conspicuous when bearing East or West. Between North point and Torrais point there is a high black rock, close to the shore, and several low detached rocks.

Nordeste point.—The east side of Corvo island consists of almost inaccessible cliffs, with rocks scattered at their bases, forming a gentle curve; Nordeste point, a bold bluff, 760 feet above high water, lies $1\frac{3}{4}$ miles south-eastward from Torrais point.

Sunk rock, with 3 feet water over it and foul ground between it and the shore, lies 3 cables, N.E. by E., from Nordeste point.

Casa point, high and surmounted by a conical hill, is situated midway between Nordeste point, and Pesqueiro point. A rock, above water, lies a cable south-east, and another, also above water, 2 cables north-east, of the point.

Depths off shore.—The bank on which Corvo island stands is generally steep; at the north extreme the 100-fathoms line is $1\frac{1}{2}$ miles distant from the shore; at Casa point, one mile. Off the south extreme, at one mile distant, the depth is 250 fathoms; along the north-west side the bank is shallow and rocky for half a mile from the coast, at which distance there are 15 fathoms, and the 100-fathoms line lies $1\frac{1}{2}$ miles from the shore.

Anchorage, on an emergency, may be found on the south-west side of Corvo island, in from 25 to 30 fathoms water, one mile off shore between Oeste point and Sugar-loaf rock; also on the south-east side of the island in depths of from 23 to 35 fathoms, over sand, three-quarters of a mile off shore between Casa point and the village of Rosario.

FLORES ISLAND, the westernmost of the Azores, is 9 miles in length in a north and south direction, and $6\frac{1}{2}$ miles in width; it is generally mountainous. In the north-west part, Morro Grande the summit, 3,087 feet above high water, slopes gradually to the northward, whilst to the southward the island is occupied by mountains about 2,000 feet high, down the sides of which numerous cascades fall into the sea. Flores is highly cultivated, and roses grow in great profusion.* The number of inhabitants in Flores island at the last census, in 1890, was 8,838.

Delgada point, the north extreme, is of moderate height, and surmounted by a conical hill having a cluster of islets and rocks extending about 3 cables from its base.

Ruiva (Red) head, the north-east extreme, 735 feet above high water, lies $2\frac{1}{2}$ miles S.E. by S. from Delgada point; the rocky coast between, receding one mile, affords sheltered anchorage, in from 20 to 25 fathoms water, over sandy bottom, from winds between S.E. by S., through south, to W.N.W., and is frequently used by vessels requiring water; at the head of this bight is situated an islet, 385 feet above high water, with foul ground lying east of it.

Bottle rock, 100 feet above high water, is detached from Ruiva head, leaving a boat passage between.

Alvaro Rodriguez island lies close to the shore, one mile southward of Ruiva head, and south-east of it anchorage may be obtained in 36 fathoms water, over sandy bottom, sheltered from westerly and south-westerly winds.

Santa Cruz, the principal town in Flores island, lies 3 miles to the southward of Ruiva head, the coast between being somewhat indented. Santa Cruz point, on the southern part of which stands the castle of Santa Cruz, and the town of that name, is low and rocky, with foul ground extending 2 cables from it.†

Communication.—There is a mail steamer from Lisbon every month.

Supplies.—Bullocks, sheep, pigs, fowls, potatoes, flour, and fire-wood can be obtained at moderate prices. Water in abundance is also procurable.

See chart No. 1,946.

* See views on chart No. 1,946.

† See plan of Santa Cruz on Admiralty chart No. 1,946; scale, $m = 3$ inches.

Repairs.—Small repairs to machinery may be executed but no repairs to hull.

Trade.—In 1897 the port was entered by 35 vessels, having an aggregate tonnage of 74,020 tons. The chief exports, consisting of cattle, butter, hides, and potatoes, amounted to £5,973, and the imports of dry goods, petroleum, sugar, coffee, tea, &c. to £16,430.

There is a Custom House; and Quarantine regulations are established.

Anchorage.—Cabeiro point, low and rocky, lies $1\frac{3}{4}$ miles south-west of Santa Cruz point, and between them is situated a bay half a mile deep, having a sandy beach and a stream at the head. This bay affords the best anchorage off the island, and from its proximity to Santa Cruz is much frequented; the usual berth is about one mile from Cabeiro point and on a line between it and Santa Cruz point, in $18\frac{1}{2}$ fathoms water, over sand; or anchorage may be taken up about three-quarters of a mile off shore in 35 or 40 fathoms water, sheltered from winds from S.W., through west, to N.N.E.

Landing may be effected between the low rocks extending from Santa Cruz point, and inside a reef immediately south-west of Cabeiro point.

Lagens point.—From Cabeiro point the coast trends in a general south-westerly direction for a distance of $3\frac{1}{2}$ miles to Lagens point, the south-east extreme of Flores island, from which rocks extend about 2 cables in a S.S.E. direction. Lomba point, $1\frac{1}{4}$ miles south-west of Cabeiro point, is high and sloping, having the church of Boa Vista at its foot, and between them is a bay, with a beach and stream at the head; in this bay anchorage may be obtained, in 22 fathoms water, over sand, but not so good as that northward of Cabeiro point.

Lagens village, with its conspicuous church, is situated in a small rocky bay close northward of Lagens point, where there is good landing.

Anchorage may be obtained in 25 fathoms water, over sand, with winds from North, through west, to S.W. by W. The bay is much frequented by sailing vessels, from the advantages it possesses for working out of it.

Escolar or Sunk rock, with $4\frac{1}{2}$ fathoms on it and deep water all around, lies $1\frac{2}{3}$ miles W. by S. $\frac{1}{2}$ S. from Lagens point. The coast north-east of Lagens point, kept open east of that point, bearing about N.E. by E., leads east; and Ilheos point, the south-west extreme of Flores island, bearing N.W. by N., leads west of it.

Coast.—From Lagens point the coast trends in a west-north-west direction for a distance of 4 miles to Ilheos point, off which lie several

detached islets, and near which are some hot mineral springs; from thence the coast turns to form the west side of the island, extending, in a north-north-east direction, 7 miles to Fanaes point, which is low; the coast between rises abruptly, and forms rocky points enclosing small sandy bays.

Ilheos point is low and rocky, Rocha Alta point about a mile south-east of it is high, brown, and steep. Between these points a shoal, with 3 fathoms water over it, extends 3 cables from the shore.

Anchorage may be obtained, in 23 fathoms water, in front of a small cove, with Ilheos point bearing E.S.E. distant about three-quarters of a mile.

Cantarinhas point, $1\frac{1}{3}$ miles north of Ilheos point, has a remarkable islet of the same name off it; between the above points the coast is cliffy, with several small points.

Bredos point, 2 miles, N.W. by N. of Cantarinhas islet, is high, cliffy, of a whitish colour, and with several islets off it; one of which resembles a column. In the bay between, two rivers, which rise in a lake at the foot of Pico Caboco, have their outlets; one of them has a fall forming a cascade.

Monchique islet, 110 feet above high water, lies one mile N.W. by W. from Fanaes point, and Baxio Raza islet, nearly joined to the shore, lies half a mile W. by N. from Fanaes point; between these islets the depth is 14 fathoms.

Baxio point lies $2\frac{1}{4}$ miles south-west of Fanaes point and between them is a bay affording anchorage with off-shore winds, in from 25 to 30 fathoms water.

Supplies.—Cattle, poultry, vegetables, and eggs may be readily obtained. By the aid of boats, water may be procured from a mountain stream, at the rate of half a ton per hour, by means of a hose, and sailing vessels, requiring water, might heave-to with winds between N.E. and S.S.E.

Landing.—The best landing place at the north-west part of Flores island is situated south-east of Baxio Raza islet.

Albernas point, the north-west extreme of Flores island, lies 2 miles, N.E. $\frac{1}{2}$ E., from Fanaes point; it is steep, of a reddish colour, and 270 feet above high water; in the indentation between is situated Gadella islet, 520 feet above high water; several rocks lie close to Albernas point, and the rocky coast trends from it E. by S., for a distance of $1\frac{1}{4}$ miles, to Delgada point, before described.

Currents.—In the vicinity of Flores and Corvo the currents have a general south-west direction, with rates of from 6 to 20 miles a day, according to the force of the wind.

Depths off shore.—The bank on which Flores island stands has somewhat the shape of the island; on the meridian of Delgada point the water deepens gradually from the shore, and the 100-fathoms line is $4\frac{1}{2}$ miles distant; at Santa Cruz it approaches to a mile, and maintains that distance to abreast of Lagens point; eastward of Ilheos point, shoal water extends 3 cables off shore; south-west of Ilheos point the 100-fathoms line is 3 miles from the shore.

Laranjeira shoal, on which the least water obtained was 11 fathoms, lies S.W. $\frac{1}{2}$ S. distant $1\frac{1}{2}$ miles from Ilheos point; there is a depth of 29 fathoms between this shoal and the shore.

On the west side of the island the 100-fathoms line is generally $2\frac{1}{4}$ miles from the shore, and the edge of the bank very steep, the depth of 200 fathoms being found at a distance of $2\frac{1}{2}$ miles from the coast.

It may be said generally that the bottom, within a distance of one mile from the island, is rocky; at about one mile distant there are belts of sand, and further off the bottom is rocky.

Tides.—It is high water full and change, at Corvo and Flores islands at 0h. 20m.; springs rise $3\frac{1}{2}$ feet.

Tidal streams.—The stream of flood tide runs to N.E. by N. and the ebb S.W. by S., with a velocity of $1\frac{1}{2}$ knots per hour at springs; these tidal streams, when opposed by gales, create a most confused sea off the north and south extremes of both islands.

FAYAL ISLAND, the westernmost of the centre group of the Azores, is separated from the north-west extreme of Pico island by Fayal channel. The island is 11 miles long, in a north-west and south-east direction, and 7 miles across near its centre; several small volcanic mountains are situated on the north-west part, but the principal portion of the island is occupied by Pico Gorda, that rises near its centre to an elevation of 3,351 feet above high water, the crater being on its north side. Fayal is noted for its mild climate and there being no ailments due to climatic causes.*

The inhabitants of Fayal numbered 23,630 in 1890; the principal town is that of Horta on its south-east side, and there are besides several villages situated in various parts of the island, the pasture land being excellent.

See chart No. 1,946.

* See Admiralty chart :—Fayal, Pico, and San Jorge islands, with views, No. 1,855; scale, $m = 0.44$ inch.

Fayal channel is $2\frac{1}{2}$ miles wide, between Espalamaca point on the western side and Magdalena rocks, which extend half a mile from the north-west extreme of Pico island, and should not be approached to a less depth than 20 fathoms; in Fayal channel the depth is generally less than 100 fathoms.*

Chapman rock, which breaks heavily in S.W. gales, is about 50 yards in extent, in a north-east and south-west direction, and has at least depth of 4 fathoms over it, with from 20 to 50 fathoms at a cable distant all round; it lies nearly in the middle of the southern part of Fayal channel, bearing S.E. $\frac{1}{4}$ E. distant $1\frac{1}{2}$ miles from Guia head, the south-east extreme of Fayal island.

Clearing marks.—Espalamaca point (a perpendicular cliff of 420 feet above high water, the north-east extreme of Horta bay), in line with João Dias point, situated $1\frac{1}{2}$ miles north of it, and bearing N.N.E. leads 5 cables westward of Chapman rock; and the south extreme of Guia head, in line with the south-west extreme of Fayal island, bearing N.W. by W. $\frac{3}{4}$ W. leads 4 cables northward of it.

When the summit of Monte (a hill in Pico island, 437 feet above high water, and situated close east of Pé do Monte point) bears S.E. by E. $\frac{3}{4}$ E. a vessel will be south of Chapman rock.

Guia head, the south-eastern extremity of Fayal island, is a peninsula 487 feet above high water, $1\frac{1}{2}$ miles in circuit, with a chapel and signal station on its summit; it is connected by a low neck to a small black mount (Monte Queimada) on the north-west side of which the town of Horta commences.

Caldeira Inferno, on the south side of Guia head, is an inlet $2\frac{1}{4}$ cables long, in a north and south direction, narrowing midway to half a cable broad, with a depth of 2 fathoms, and then expanding into a basin $1\frac{1}{4}$ cables wide, with from 2 to 4 fathoms water in it.

Pim bay, on the west side of Guia head, is used in fine weather by small vessels, but it is quite open to the south-west. Porto Pim at the head of this bay has in it depths of from one to $2\frac{3}{4}$ fathoms.

Coast.—West of Guia head for a distance of 4 miles, the coast is low and rocky.†

Castello Branco, the south-west extreme of Fayal island, is a round conspicuous peninsula, situated 6 miles westward of Guia head; midway is situated the cove of Feiteiras, with several islets westward of it. East of Castello Branco point, distant $1\frac{1}{2}$ miles, in front of a village, boats may effect a landing.

* See plan :—Fayal channel, with views, on Admiralty chart No. 1,940; scale, $m=2.5$ inches.

† See chart No. 1,855.

Comprida point, the north-west extreme of Fayal island, lies $5\frac{1}{2}$ miles N. by W. $\frac{1}{2}$ W. from Castello Branco point; in the bight midway landing may be effected, as also in the little bight immediately east of the point. Negra point is the name by which the northern extreme of Comprida point is known.

Capellinha rock, above water, is the outer of several dangers lying off Comprida point; between the rock and the point there is a narrow passage available for boats in fine weather.

LIGHT.—Capellinha.—On the western point of Fayal and abreast Capellinha rock, a *fixed and flashing* light, showing *red flashes every thirty seconds*, is *intended*, from an octagonal shaped lighthouse, about 100 feet in height, constructed of masonry, with a dwelling adjoining, at an elevation of 297 feet above high water, which should be visible over an arc of 222° from a distance of 24 miles, in clear weather.

Fog signal.—*Siren intended.*

Cedros point, the north-east extremity of Fayal island, is high and bold, situated 6 miles eastward of Negra point; the intermediate coast is clifty, forming a bight, one mile deep, named Praya da Norte bay, at the head of which there is a sandy beach, with a village on its western side.

About a mile west of Cedros point is Jorge point, high with perpendicular cliffs; it is conspicuous on account of a small peak 436 feet above high water.

Ribeirinha point.—From Cedros point the coast trends S.E. by S. for a distance of 6 miles; the shore is clifty and terminates in a sharp point named Ribeirinha, the east extreme of Fayal island; midway, at Salaõ point, landing may be effected. From Ribeirinha point the coast trends S.S.W. $\frac{3}{4}$ W. for a distance of $2\frac{3}{4}$ miles to Espalamaca point, the northern limit of Horta bay; Joaõ Dias point lies midway.

In the bay northward of Espalamaca point, known as Praya bay, small coasting vessels find shelter in southerly winds.

Horta bay, situated at the south-east extremity of Fayal island, is three-quarters of a mile deep. Espalamaca point, its north entrance point, bears from Guia head, its south limit, N.E. $\frac{1}{2}$ E. distant 2 miles, the depth midway on that line being from 16 to 22 fathoms; the 10-fathoms line is generally $2\frac{1}{2}$ cables from the shore.*

At a quarter of a mile west of Espalamaca point is situated a signal station on a hill, 420 feet above high water, from which the cliffs on the

See chart No. 1,855.

* See plan :—Horta and Pim bays, on Admiralty chart No. 1,940; scale, $m = 6\cdot0$ inches.

northern side of the bay decline to the low black sandy beach, which, from Fort de Lagoa, extends round the head of the bay to the mole and landing place at the southern part of the town; from this mole the coast rises to Monte Queimada, from the north-east base of which rocks and shoals extend 2 cables. The coast on the east side of Monte Queimada is formed of high steep bluffs fringed by rocks and shoals, extending one cable from the shore.

Horta.—The most conspicuous objects in the town of Horta are the convent of San Francisco, having two towers, the Jesuit college near the beach about the middle of the town, and the Carmelite convent on high ground at the western part of the town.

The population of Horta is about 7,500.

Breakwater.—The breakwater extends about 620 yards N.E. $\frac{5}{8}$ N. from Queimada point, then bends N. by E. for a distance of about 80 yards, but this latter part (1899) is not yet completed as regards the upper works, although the rubble base is above water; the breakwater is about 70 feet wide and has a short mole extending in a north-west direction about 100 yards from its commencement, midway between this and the extremity of the breakwater there are landing steps.

Bollards and rings are fixed in the masonry. The harbour should be capable of sheltering fifteen to twenty large steamers, four of which can be berthed alongside the breakwater in a depth of 5 fathoms, and there are four sets of stern moorings in the harbour.

LIGHT.—At about 50 yards within the extremity of the breakwater, a *fixed red* light is exhibited, at an elevation of 28 feet above high water, from a crane, 13 feet in height; it should be visible in clear weather from a distance of 7 miles. This light is lighted as convenient.*

Mooring buoy.—A mooring buoy, to which vessels can make fast, is moored N. by E., distant $1\frac{1}{2}$ cables from the extremity of the breakwater.

Communication is with Europe twice a month by steam-vessels to Lisbon, and the same with the other islands of the group. Steamers from London to the West Indies call here. See page 25.

There is a submarine cable between Horta, San Miguel, and Lisbon: there are also cables to Pico, Terceira, San Jorge, and Graciosa.

Coal is supplied and sent off in lighters containing from 20 tons to 25 tons, and passed on board in baskets or bags; vessels coaling anchor outside the breakwater. About 3,000 tons are usually kept in store, but none is kept laden, so as to be available for present demand. About 200 tons can be put on board in a day, or 350 tons working day and night.

See chart No. 1,940.

* U.S.B.N. 45 of 1896. Light not displayed on 27th Sept. 1896.

Supplies of beef, vegetables, and bread of good quality, and plentiful, may be obtained. Spars and other ship's stores can also be supplied.

Repairs.—Only slight repairs to iron vessels and machinery can be made at the Government breakwater works. Wooden vessels up to 150 tons are built.

Landing.—The landing-place at Horta bay is very good, being built of stone, and is now much sheltered by the breakwater; but occasionally, on account of the sea, landing is rendered difficult if not impossible.

Custom house.—The rules are numerous; they are supplied to vessels arriving at the anchorage.

Quarantine.—Vessels calling at Fayal must be prepared to find quarantine regulations strictly enforced; they are required to remain outside the breakwater until visited by the health officer.

Hospital.—There is a public hospital where seamen are admitted.

Signal station.—There is a Lloyd's signal station on Espalamaca point.

Trade.—In 1896, 28 sailing vessels with an aggregate tonnage of 10,173 tons; and 84 steam-vessels with an aggregate of 125,880 tons, including all nationalities, entered the port. The chief exports were corn, butter, wine, cattle, hides, and fancy straw, of the value of £20,935. The imports were cotton, woollens, haberdashery, hardware, groceries, lumber, coal, iron, paint, petroleum, &c., the total value being £56,166.

Anchorage.—This is one of the best anchorages among the Azores, although open to winds from N.E. to E. by S., and from S.S.E. to S.W.; the latter occasionally blow hard, but the holding ground (fine black lava sand) is good, and a well-found vessel might ride securely, though it is generally advisable to weigh and run to leeward of the island until the wind abates.

A sailing vessel, to be in a good position from which to weigh, should anchor in 25 fathoms water, over sand, with Espalamaca point bearing N.E. $\frac{1}{2}$ N., and the north extreme of the Jesuit college in line with the south extreme of the Carmelite convent bearing N.W. (the Carmelite convent is high and conspicuous); this is the usual anchorage for vessels of war; steam-vessels may approach nearer the town, but should not anchor in a less depth than 14 fathoms. With S.W. winds a heavy sea sets in to the bay.

Directions.—No difficulty presents itself in standing in to Horta bay. Guia head is "steep-to," but Espalamaca point should not be approached within a distance of 3 cables, as the ground is irregular

and shoal for more than 2 cables off it, and at $1\frac{1}{2}$ cables south-east of the point is situated a rock with 12 feet water on it.

When steaming into the anchorage, it was observed that the flood tide set strong towards Guia head, which would have to be guarded against in a sailing vessel.*

Princesse Alice Bank named after the yacht belonging to H.S.H. the Prince of Monaco, who first discovered its existence, lies S.W. by W. $\frac{3}{4}$ W., distant 45 miles from the summit of Fayal, or approximately in lat. $37^{\circ} 58' 15''$ N.; long $29^{\circ} 18'$ W.: it is nearly 2 miles in length in a north-north-east and south-south-west direction, and the least depth found was 24 fathoms, over a bottom of black and red sand, rock and shells.

The soundings deepen rapidly on all sides, except to the south-eastward in which direction depths, less than 200 fathoms, extend for a distance of about 8 miles; the least depth, found in this direction, being 104 fathoms, situated about S.E. by S. distant $5\frac{1}{2}$ miles from the centre of Princesse Alice bank. Several soundings of less than 100 fathoms were afterwards obtained between the banks and Fayal. Fish are exceedingly abundant on this bank.†

Tides.—It is high water, full and change, at Fayal island at 11h. 45m.; springs rise 4 feet.

Tidal streams.—In Fayal channel the flood stream sets N.E., and the ebb S.W., with a velocity of from 1 to 2 knots an hours.

PICO ISLAND, the loftiest of the Azores, derives its name from the volcanic mountain near its south-west part, 7,613 feet above high water, the remarkable peak of which terminates in a sharp cone shaped like a sugarloaf, visible in clear weather for a distance of 75 miles; it is frequently, however, obscured by clouds for five or six days consecutively.‡

Smoke, flames, and ashes have been emitted from the peak, to some distance.

The island, of an irregular ovate shape, and surrounded by steep coast, without harbours, is 25 miles long, in a N.W. and S.E. direction, and $8\frac{1}{2}$ mile across in its widest part, which is about 7 miles from the north-west extremity and near the base of the peak. Pico Topo, 5,357 feet above high water, is situated 9 miles from the south-east extreme, and several peaks of 2,000 feet rise over the south-east portion of Pico island. The number of inhabitants in Pico island was 27,437 in 1890.

* Staff Commander G. S. Hirtzel, H.M.S. *Northumberland*, April 1880.

† See plan of Princesse Alice bank, scale, $m = 0.47$ inch on Admiralty chart No. 434.

‡ See plan of Pico island, with views, on chart No. 1,855.

There are no good anchorages for large vessels, the coast is generally rugged, wild, without shelter and inaccessible, but there are some coves where small craft may find anchorage.

Communication.—Pico has communication by submarine cable with Lisbon *viâ* Fayal and San Miguel. The branch cable to Horta, Fayal, starts from Arealarga, on the west side of Pico; that to San Jorge from Prainha, on the north side.

Ponta da Ilha, the south-east extremity of the island, is low and sloping, with foul ground extending one cable eastward from it. The next projection to the westward is Calheta point, $2\frac{1}{2}$ miles distant, and off which are two small islets; between these points are two small bays where landing may be effected, the better of the two being that immediately east of Calheta point.

Point Negra is situated $3\frac{1}{2}$ miles north-west of Calheta point, here the cliffs are overhanging, having at the top a road, with houses on either side of it and following the direction of the coast.

One and three-quarter miles west of Point Negra are the point and port of Ribeiras; the latter, into which a mountain torrent flows, is only suitable for coasting vessels.

Biscoito point, broad and not high, lies about three-quarters of a mile west of Ribeiras, and about a mile beyond is the little town of Santa Barbara, built close to the edge of a cliff.

Arrife point, on which stands a cone 1,461 feet above high water, is the south-west extreme of Pico island, and lies $7\frac{1}{4}$ miles W. by N. $\frac{1}{2}$ N. from Calheta point; the coast between is rocky, and should be avoided, but in the bight, landing may be effected by those having local knowledge.

Santa Catanina point, low and rounded, is situated N.W. $\frac{1}{2}$ N., distant $3\frac{3}{4}$ miles from Arrife point; in the bay between is situated the lagoon of Lagens, that has boat communication with the sea at high water, and near which is built the town of the same name. Above Santa Catanina is situated the crater of the eruption of 1720.

The south-west and west coasts of Pico island, the latter forming the eastern shore of Fayal channel, are cliffy and fringed with rocks and islets from Sta Catanina point to Baixio Grande point, the north extreme, a distance of 17 miles. Three miles west of Sta Catanina point is situated San João point, surmounted by two craters, and at 4 miles further westward lies the round point of San Mattheus on which are five small hillocks.

Espartel point is $3\frac{3}{4}$ miles north-west of San Mattheus, and the coast between is all low, with little islets and large rocks off it.

The village of Candelaria, situated $2\frac{1}{4}$ miles south of Pé do Monte point (the southern limit of Fayal channel), is easily recognised by two towers standing close together.

Rollers extend nearly 3 miles off the north extreme of Pico island during a gale.

Magdalena rocks, the eastern and smaller 237 feet above high water, lie half a mile north-west of the most prominent portion of the north-west extreme of Pico island. The bottom between them and the island is foul, and from the westward they should not be approached to a less depth than 20 fathoms.

Magdalena town, whence the greater part of the produce of Pico is conveyed to Fayal in boats, is situated at the north-west extreme of the island, abreast the rocks of the same name.

North-east coast.—From Baixio Grande point to the south-east extreme of the island the coast is very rugged, and there are only four places where lauding may be effected, viz., at Porto Caxorro, 4 miles east of Magdalena; on the north side of San Antonio point, $9\frac{1}{4}$ miles east of that town; at Caes do Pico, three-quarters of a mile south-east of San Antonio point; and at the village of San Roque, one mile south-eastward of the latter place.

A reef, $2\frac{1}{2}$ cables long N.E. and S.W., and half a mile off shore, lies $1\frac{1}{2}$ miles south-east of Misterio point, and $1\frac{1}{4}$ miles further eastward is situated the large village of Prainha.

Between Terra Alta and Ribeirinha points, there is a sandy shore with some cliffs; midway between these points, a rock named Rocha Alta lies close to the shore, and a reef extends $1\frac{1}{2}$ cables north-west of Ribeirinha point.

One mile south-east of Ribeirinha point is port Baxia, a small cove only available for small craft, and inland, and about midway between this and Castellito point, is the village of Piedade, where there is a conspicuous church.

Most of the projecting points on this coast are low and fronted by rocks, rising rapidly to the interior; Misterio point, which lies about midway between the north-west and south-east extremes of the island, being the most prominent; the eastern portion of this coast is rather higher and more cliffy than the western.

Submarine cable.—The telegraph cable from San Jorge is landed at Prainha.

Depths off shore.—The bank on which the islands of Pico and Fayal stands is 45 miles long, north-west and south-east within the

depth of 100 fathoms ; off the south-east extreme of Pico, the depth of 200 fathoms is found at a distance of 5 miles from the shore, whilst the north-east and south-west coasts of the islands are generally less than a mile from the edge of the 200-fathoms line. At Misterio point, on the north-east side of Pico, this line is only half a mile off shore ; but at Arrife point, on the south side, it is $1\frac{3}{4}$ miles from the coast. Off the north-west extreme of Fayal the 200-fathoms line is 2 miles from the shore, and maintains an even distance of about a mile from the coast on the north-east and west sides.

SAN JORGE ISLAND lies north-east of Pico, separated from it by a deep channel $9\frac{1}{2}$ miles wide.*

The island is long and narrow, extending in a N.W. $\frac{1}{2}$ N. and S.E. $\frac{1}{2}$ S. direction, for a distance of 29 miles, with an average breadth of $2\frac{1}{2}$ miles, the north-west extreme being sharp and pointed. It is occupied by a series of volcanic mountains, the highest, near the centre, being 3,498 feet above high water.

The population is about 12,000.

Communication.—San Jorge has communication by submarine cable with Lisbon *viâ* Pico, Fayal, and San Miguel ; the cable is landed at Villa des Vellas, on the south-west side of the island. A branch cable is laid to Graciosa ; the cable starts from Caldeira cove, on the north-east side of the island.

Supplies.—Wines of good quality, which are exported to Terceira and the United States, are made on the island, but only a sufficient quantity of wheat and maize for a part of the population is grown ; various kinds of cattle are raised, and thrive well on San Jorge island, and good cheese is produced ; wood and water are abundant.

Topo point, the south-east extreme of San Jorge island, lies E. $\frac{3}{4}$ N. distant 15 miles from the south-east extremity of Pico ; it is moderately high, and rendered conspicuous by the islet off it, and the village situated south-west of it.

Topo islet about half a mile in circuit, and 60 feet above high water, lies 2 cables, eastward of Topo point ; a few rocks lie around it, and the passage between it and San Jorge is blocked with rocks.

South-west coast.—Pontinha point lies half a mile south-west of Topo point, and between it and Monteiro point, 3 miles to the westward, the coast is clifty.

Manadas point, low and shelving, with a reef extending 2 cables from it, is the next projection, lying N.W. $\frac{1}{4}$ N. distant 10 miles from

* See plan of San Jorge island and views, on chart No. 1,855.

Monteiro point; the intermediate coast is clifty, with stones and rocks at the water's edge.

About two-thirds of a mile east of Manadas point is the creek and town of Calheta, where landing may be effected; a great quantity of wood is exported to the adjacent islands.

Queimada point is rather low, has a small fort on it, and lies N.W. $\frac{1}{2}$ N., distant $8\frac{3}{4}$ miles, from Manadas point, the coast between being low and rocky.

Morro Grande, high and of a blackish colour, with a look-out station on its summit, lies $1\frac{1}{2}$ miles north-west of Queimada point; between these points the coast forms a bay sheltered from off-shore winds, at the head of which is situated Villa das Vellas, the capital of the island.

Vellas bay affords shelter from winds between W.N.W., through north, to S.E.; the head of the bay is formed by tolerably high cliffs forming several points. The town is situated at the northern part of the bay, and in a creek at its south-eastern part there is a small mole, affording sheltered anchorage to small coasting vessels, in $2\frac{3}{4}$ fathoms water, over rocky bottom.

LIGHT.—At the head of Vellas bay, two iron supports with a small structure near them, the whole 22 feet in height and painted red, exhibit, at an elevation of 62 feet above high water, a *fixed white* light, which should be visible, in clear weather, from a distance of 8 miles.

Anchorage.—The usual anchorage is outside, in 9 fathoms water, over sand, about midway between Morro Grande and Queimada point, with the mole bearing North.

Tides.—It is high water, full and change, in Vellas bay at 0h. 30m.; springs rise 4 to 5 feet.

Rosales point.—At three-quarters of a mile north of Morro Grande is situated a small point surmounted by a hill known as Morro do Lemo, and between is a rocky light, which, having been mistaken for Vellas bay, has caused several wrecks; at $6\frac{1}{2}$ miles north-west of Morro Grande, San Jorge island terminates in Rosales point, which is narrow and sharp; the coast between is formed of cliffs.

Rosales rock, 234 feet above high water, lies 3 cables north-west of Rosales point, and is surrounded by rocks above and below water; it is connected with the shore, and the group includes Rosalina rock, 232 feet above high water, lying 3 cables S.S.W. from the point.

North-east coast.—From Rosales point the coast, composed of barren rugged cliffs, extends 13 miles in a south-easterly direction to Norte Grande point, from which a reef extends for a distance of $2\frac{1}{2}$ cables, whence to Topo point it is lower and more regular, with a few indentations.

See chart No. 1,855.

With the exception of the reef off Norte Grande point, the rocks which in some places fringe this coast are close to the shore.

Landing places.—On the south side of San Jorge island, landing may be effected close westward of Pontinha point; inside a reef, 2 miles north-west of Monteiro point; in the bight $7\frac{1}{4}$ miles north-west of Monteiro point; in a creek named Calheta, three-quarters of a mile eastward of Manadas point; under Castellitos point, 5 miles north-west of Manadas point; and at Villa das Vellas. On the north side the only landing-place is close eastward of Norte Grande point.

Depths off shore.—Off the north-west and south-east extremities of San Jorge island, the 200-fathoms line is 5 miles distant from the coast; on the north-east side it is generally about $1\frac{1}{2}$ miles from the shore; on the south-west side, off Monteiro point; it is 3 miles; at Manadas point half a mile, and that latter distance is maintained, until within one mile of the north-west extremity of the island.

GRACIOSA ISLAND, the most fertile of the Azores, with 8,000 inhabitants, and the northernmost of the central group, is separated from San Jorge island by a clear channel 20 miles wide.*

The island is 7 miles in length in a N.W. and S.E. direction, with an average breadth of 3 miles; the highest mountain, 1,349 feet above high water, stands over the south-east extreme; there are two others, having deep valleys between them, that, from a distance, present the appearance of two or three islands, particularly when seen from the south-westward.

Communication.—Graciosa has communication by submarine cable with Lisbon, *viâ* San Jorge, Pico, Fayal, and San Miguel; the cable is landed at Praya, on the east of the island.†

Supplies.—Barley is grown in large quantities, also wheat, maize, grapes, all kinds of fruit, and vegetables. Sheep, pigs, and fowls are reared in great numbers; the only scarce article is wood, and that is principally obtained from San Jorge and Pico islands.

Carapacho point, the south-east extremity of Graciosa island is low near the coast, but high and rugged a short distance inland; south-west of the point are situated several islets, and sunken rocks extend 4 cables in a S.S.W. direction; from the outer rock, with a depth of 7 feet, the north extreme of Baxo rock bears E. $\frac{1}{4}$ S. distant $4\frac{1}{2}$ cables; this rock lies in a direct line between Sul point and the south extreme of Baxo rock, about midway between them.†

See chart No. 1,855.

* See Admiralty chart:—Terceira and Graciosa islands, with views, No. 1,818; scale, $m = 0.5$ inch.

† See plan:—Caldeira of Graciosa, on Admiralty chart No. 1,818; scale, $m = 2$ inches.

Baxo rock, 450 yards long, with a high conical summit at its north-west extremity, has foul ground around; it lies 3 cables S.S.E. from Carapacho point, and there is a depth of 14 fathoms between it and that point.*

Praya bay.—From the south-east extreme of Graciosa island to Fanais point, the south-east extreme of Praya bay, a distance of $1\frac{1}{2}$ miles, the coast is clear; from Fanais point, the north entrance point of Praya bay bears N. $\frac{1}{2}$ W., distant $1\frac{1}{3}$ miles, the coast between receding 2 cables. Negra point, the north point of the bay, is low and rocky; to the southward of it stands the town of Praya.†

Praya island, three-quarters of a mile in circuit, and wedge shaped with the summit over the north-east point, lies half a mile E. by S. $\frac{1}{2}$ S. from the north entrance point of Praya bay; several rocks lie around it, and E.S.E., distant $2\frac{1}{2}$ cables from the south extreme, there is a shoal with 4 feet of water over it, and 12 fathoms between it and the island. A detached shoal with a depth of 6 feet on it, lies North, distant $1\frac{1}{2}$ cables, from the north-east extremity.

Anchorage.—The usual anchorage off Praya is about $3\frac{1}{2}$ cables southward of the island, in 13 fathoms water.

Ferreira point, the east entrance point of Santa Cruz bay, lies $2\frac{1}{2}$ miles north of Praya bay, the coast between consisting of small bights; the point is low, and foul ground extends north-east from it for a distance of $1\frac{1}{4}$ cables.

Santa Cruz, the principal town of Graciosa island, is situated in a bight close westward of Ferreira point, and rendered conspicuous by three small hills lying immediately south-west of the town, on the summit of each of which is situated a church.

LIGHT.—A small structure, with iron supports, 21 feet in height and painted red, on Fort do Santo, exhibits, at an elevation of 49 feet above high water, a *fixed white* light which should be visible in clear weather from a distance of 8 miles.

Anchorage.—Vessels will find the best anchorage Graciosa affords to the eastward of Santa Cruz, in from 35 to 40 fathoms water, over sand, off the southern extreme of a slope extending to Ferreira point, with Baxo rock showing between Praya island and the shore of Graciosa bearing about S. $\frac{1}{2}$ W., and Santa Cruz point bearing N.W. $\frac{1}{2}$ N. To this anchorage all goods from the town of Santa Cruz are brought for shipment.

See chart No. 1,818.

* See views on chart 1,818.

† See plan :—Praya de Graciosa, on Admiralty chart No. 1,818; scale, $m = 2$ inches.

Tides.—It is high water, full and change, in Santa Cruz bay, at 0h. 15m.; springs rise $3\frac{1}{2}$ feet.

Coast.—From Santa Cruz the coast, fringed with rocks, trends north-west for a distance of $2\frac{1}{2}$ miles, and forms Pico Negro point the north extreme of the island, which is high and very black, whence to the south-west it continues high and rocky, for a distance of 2 miles, to Fozo do Porto, the north-west extreme of the island, a double point with a small bight between; it then trends to the southward.

At half a mile south of Fozo do Porto point lies Gomez point, low and rocky, situated at the base of a conical hill known as Monte Vermelho. Gomez bay, between Fozo do Porto and Gomez points, is surrounded by cliffs and affords tolerable landing at its southern part.*

Branca point, the south-west extremity of Graciosa island, a short distance within which stands one of the highest mountains of the island, lies $2\frac{3}{4}$ miles, S. $\frac{3}{4}$ E., from Gomez point. From Branca point the coast trends south-east for $3\frac{1}{4}$ miles to Sul point, which is high and bluff. At $1\frac{3}{4}$ miles south-east of Branca point lies Fogo point, low and rocky; in the bight between is situated Fogo village, and Forte island lies close to the shore, half a mile northward of Fogo point.

Carapacho point, previously described, lies one mile east of Sul point; in the bights between the points there are several mineral springs.

Landing may be effected in the north part of Praya bay; at Santa Cruz; in Gomez bay, northward of Gomez point; and in Fogo bay, near Forte island.

Depths off shore.—Graciosa island stands on a bank 14 miles long within the 200-fathoms line, and $10\frac{1}{2}$ miles wide. Off Baxo rock the 100-fathoms line is $1\frac{1}{4}$ miles distant from the coast; off Praya island, three-quarters of a mile; off Santa Cruz, 2 miles; north of Pico Negro point it is 3 miles distant; north-west of Fozo do Porto it is $2\frac{1}{4}$ miles; south-westward of Branca point it is $3\frac{1}{2}$ miles; whilst on the meridian of Fogo point it is only half a mile from the shore. Generally speaking, the depth of 200 fathoms will be obtained at a distance of half a mile beyond that of 100 fathoms.

TERCEIRA ISLAND, the easternmost of the centre group of the Azores, is 16 miles in length N.W. and S.E., and about 8 miles in breadth; it is situated 20 miles east of the south-east extremity of San Jorge island, with a clear channel between; the coast is high, and surrounded with rocks, the only accessible places being fortified.†

See chart No. 1,818.

* See plan :—Gomez bay on Admiralty chart No. 1,818; scale, $m = 2$ inches.

† See plan of Terceira island, on chart No. 1,818.

The interior of the island is generally mountainous; in the south-east portion of Terceira island there is a high and almost circular plateau, about 4 miles in diameter, surrounded by high mountains, which are steep to the southward but slope gradually to the northward.

The highest summit in the island (Caldeira de Sta. Barbara) occupies the western extreme, and attains the elevation of 3,500 feet: good roads lead to all parts of the island. The island is fertile, healthy, and pleasant, and has a population of about 47,000.

In consequence of its central position and the safety of the anchorage at Angra, it was made the seat of Government.

Produce.—Large quantities of grain, potatoes, lemons, oranges, and other fruits are grown. Good pasturage for cattle is also afforded.

Malmerendo point, the eastern extreme of Terceira island, is high, and forms the north point of Praya bay; close to it lies a rock that uncovers at low water.

Praya bay, at the east extreme of Terceira island, is 2 miles wide and three-quarters of a mile deep; Baxios point, the south entrance point of the bay, bears from Malmerendo point S.S.W.; on that line the depths are from 8 to 15 fathoms, shoaling gradually to the beach; the south-west corner of the bay dries nearly 3 cables from the shore, and consequently does not afford such good landing as the north-west corner, where the town stands.*

Praya is a fine and regularly laid out town, protected by a sea wall; a few black rocks lie close to the beach; there were 3,156 inhabitants in 1890. Three small streams fall into Praya bay, the southern near the village of Cabo da Praya, situated at the southern part of the bay.

Communication.—Praya has telegraphic communication with Angra.

Coal and supplies.—There is generally a stock of about 1,000 tons of coal, which is taken off to vessels in 10-ton lighters; provisions, water, and wood may be obtained.

Custom house and quarantine regulations as in other Portuguese ports.

Anchorage.—The best anchorage in Praya bay is in from 19 to 21 fathoms water, over sand, one mile off shore, with Malmerendo point in line with the west extreme of Carneiros islet bearing N. $\frac{1}{2}$ W., and two towers at the bottom of the bay in line. The comparatively shoal water of Praya bay admits of several vessels lying at anchor at the same time,

See chart No. 1,818.

* See plan:—Praya bay, on Admiralty chart No. 1,818; scale, $m = 2$ inches.

sheltered from winds between S.W. and North, but entirely exposed to those from the eastward.

Contiendas point, the south extreme of Terceira island, surmounted by three peaks about 500 feet above high water, lies $3\frac{3}{4}$ miles south-west of S. Jorge point; in the bight between, landing can be effected under Pico da Cruz, which is 715 feet above high water.

A bank on which the least depth ascertained is 28 fathoms, with from 70 to 100 fathoms close to, and 50 fathoms between it and the shore, lies S.S.W. $\frac{1}{4}$ W. distant $1\frac{3}{4}$ miles from Contiendas point; from the bank Frayles rocks bear W. by N. $\frac{1}{2}$ N. distant $1\frac{2}{3}$ miles.

Landing may be effected in a cove three-quarters of a mile westward of Contiendas point, and in the bay $1\frac{3}{4}$ miles north-east of it.

Frayles rocks, lying S.E. $\frac{1}{4}$ E. distant $5\frac{3}{4}$ miles from the south extreme of mount Brazil, and S.W. by W. $\frac{1}{2}$ W. distant $2\frac{1}{2}$ miles from Contiendas point, are two in number, 30 feet high, with shoal water close to them, but at a distance of 3 cables all round, there are depths of from 50 to 70 fathoms.

Cabras (Goat) islands lie W. by N., distant 3 miles from Contiendas point and S.E. by E. $\frac{1}{4}$ E., $3\frac{1}{4}$ miles from the south extreme of mount Brazil, or nearly midway between Contiendas point and Angra bay, and two-thirds of a mile, S.W. by S., from the nearest shore, with 14 fathoms between them and Terceira island.*

The islands are about a mile in circuit; the eastern is the larger, 480 feet above high water, and appears wedge-shaped when seen on an east or west bearing; the passage between them is 100 yards wide, with from 7 to 10 fathoms water, and is used by boats.

Mount Brazil, forming the western shore of Angra bay, for which it is an excellent mark, is situated near the middle of the south coast of Terceira island; it is a remarkable peninsula 2 miles in circuit, 555 feet above high water, with a look-out station on its summit.†

ANGRA.—At the base of mount Brazil on its north side, is situated the fort of St. Juan, the chief defence of Terceira island and of the city of Angra, built to the northward and eastward of it, which is the capital and residence of the Captain-General of the Azores.

From the fort, defences extend to fort San Antonio, on the east side of mount Brazil; on the north-east side of the bay stands fort San Sebastian.

LIGHT.—On San Antonio point, Angra bay, a small structure with iron supports, 19 feet in height and painted red, exhibits, at an elevation of 80 feet above high water, a *fired white* light which should be visible in clear

* See plan :—Cabras islands, on Admiralty chart No. 1,818; scale, $m = 2$ inches.

† See plan :—Angra de Terceira, on Admiralty chart No. 1,818; scale, $m = 2$ inches.

weather from a distance of 8 miles between the bearings of N.E. $\frac{7}{8}$ N. through north, to S. by W. $\frac{1}{8}$ W. (202°); but the light is obscured by Cabras islets between the bearings N.W. $\frac{1}{2}$ W. and N.W. by W. $\frac{1}{8}$ W.

The light should not be brought to bear westward of N.W. $\frac{1}{8}$ N. to clear the Frayles rocks, passing to the southward.

Communication.—Terceira has communication by submarine cable with Lisbon, *via* Pico, Fayal, and San Miguel. The cable is landed at Angra, on the south-west side of Terceira.

Angra bay.—Val point, the east extreme of Angra bay, bears from the south-east point of mount Brazil, E. $\frac{1}{4}$ N. distant $1\frac{1}{10}$ miles; the bay extends 7 cables, in a northerly direction, contracting midway abreast fort San Sebastian to $3\frac{1}{2}$ cables in width, where the depth is from 7 to 9 fathoms, over sand, with 4 fathoms at $1\frac{1}{2}$ cables from the head; this inner bay is the usual anchorage for small vessels.

Large vessels should anchor in 30 fathoms, with the bay open, and the south-west extreme of mount Brazil bearing N.W. by W. $\frac{3}{4}$ W., distant one mile; in this position, however, the holding ground is not very good. Angra bay is open to winds between S.S.W., through south, to E.S.E., and with S.W. winds a heavy swell sets round mount Brazil.

From June to September, when fine weather prevails, vessels may lie in safety; but at other seasons of the year a constant watch should be kept, and an offing sought on any indications of approaching bad weather. See Chapter I., page 41.

Signals.—When the state of wind and sea is such that it would not be prudent to anchor in Angra bay, a large red and white pendant is hoisted at the Custom house and also at San Antonio point, to warn approaching vessels to remain outside until the weather moderates.

Tides.—It is high water, full and change, in Angra bay at 0h. 32m.; springs rise $4\frac{1}{2}$ feet.

Serreta point.—From mount Brazil the coast curves north-westward for a distance of 11 miles, and then forms a rocky projection named Serreta point, the north-west extreme of Terceira island; on this portion of the coast there is only one landing place, situated 6 miles north-west of mount Brazil, close westward of a mountain stream.

Serreta rocks lie 2 miles off the north-west extreme of Terceira island, with Serreta point in line with the Caldeira de Sta. Barbara, bearing S.E. $\frac{3}{4}$ S. They consist of two shoals of $4\frac{3}{4}$ fathoms, extending three-quarters of a mile north and south, and half a mile in width; at half a mile northward of the rocks, there is a depth of 35 fathoms quickly

deepening to 100 fathoms, and between the rocks and the shore 80 fathoms in the deepest water.

NORTH COAST.—From Serreta point the coast trends eastward for 6 miles to Rua Longa point, that has a rock close north of it and affords landing in a cove to the westward. The Pico de Pinto, 502 feet above high water, and situated $1\frac{3}{4}$ miles west of Rua Longa point, is a conspicuous object on this coast; it is the half of a conical hill, the outer portion of which has been carried away by the sea.

From Rua Longa point the coast trends S.E. by E. 7 miles to Espartal point, being composed of clifty bights, in one of which, situated $1\frac{1}{2}$ miles south-east of Rua Longa point, is the village of Santa Beatrice, and in another 2 miles west of Espartal point, and with rocks off its entrance points, landing may be effected in front of the town of Villa Nova.

Mysterio point, $2\frac{3}{4}$ miles south-east of Rua Longa point, appears on some bearings as a low cliff surmounted by a rock in the form of a cone.

From Espartal point the coast is straight for $2\frac{1}{4}$ miles in a S.S.E., direction to Carneiros point, whence it turns south to Malmerendo point, forming a bight $1\frac{3}{4}$ miles across.

Villa Novo rock, consisting of a cluster of rocks above water, lies one-third of a mile off shore bearing N.W. $\frac{1}{2}$ W., one mile distant from Espartal point, with depths of 7 fathoms between the rock and the shore, and 14 fathoms at 3 cables from it in a north-east direction.

Carneiros islet, 62 feet above high water and “steep-to,” is situated $1\frac{1}{2}$ miles S.E. $\frac{3}{4}$ E. from Espartal point; it lies half a mile off shore, with 17 fathoms water between.

Volcanic eruption.—On the bearing of N.N.W. $\frac{1}{2}$ W. and $9\frac{1}{2}$ miles distant from Serreta point is the site of an eruption that occurred in June 1867; nothing now remains to mark the position.

Depths off shore.—In an easterly direction from Malmerendo point the 100-fathoms line of the bank of soundings on which Terceira island is situated, is found at a distance of $2\frac{1}{4}$ miles and falls very steeply; south-east of the island, the 100-fathoms line is 5 miles from the shore, the soundings gradually deepening to a depth of 200 fathoms at 9 miles.

On the meridian of Frayles rocks, at one mile from them, there is a depth of 100 fathoms, and at 2 miles distance, 200 fathoms, but immediately west of these rocks the 200-fathoms line is found at a distance of $5\frac{1}{2}$ miles south of Cabras islands; from this position the edge of the bank takes a N.N.W. direction.

On the meridian of mount Brazil, the 100-fathoms line is one mile off shore, and the edge of the bank “steep-to”; on the south-west

side of the island it is only half a mile from the shore; this distance is maintained till off the north-west extreme, where the 100-fathoms line off the bank on which Serreta rocks stand, is 4 miles from the shore and the 200-fathoms line $5\frac{1}{2}$ miles; at 3 miles eastward of Serreta point, the 100-fathoms edge of the bank, which is very steep, is one mile from the shore; in a northerly direction from Rua Longa point the 100-fathoms line is $1\frac{1}{2}$ miles distant, and the soundings gradually deepen to 200 fathoms at 6 miles, whence to the east extreme of the island the 100-fathoms line is about a mile off shore, and the bank steep.

SAN MIGUEL (St. MICHAEL) is the northern island of the eastern group of the Azores.*

The north-west extreme of San Miguel island bears from the south-east extreme of Terceira island S.S.E. $\frac{1}{2}$ E., distant 75 miles; in the channel that separates them many rocks have been reported on various occasions, but it was specially and thoroughly examined by Captain Vidal, in H.M.S. *Styx*, during the Admiralty survey in 1843-44, when no indications of rocks were found, and the soundings varied from 195 to 350 fathoms.

This island is the largest and most important of the Azores, being 35 miles in length in a W.N.W. and E.S.E. direction, and from 4 to $8\frac{1}{2}$ miles in breadth, the narrowest part being from the bay east of Delgada point on the south, to the head of a large bight on the north side; it contains a number of mountains, hills, and valleys, of volcanic origin; the eastern extreme of the island is the highest, being occupied by mountains more than 2,000 feet high, the most elevated, Pico da Vara, 4 miles from the extreme east point, being 3,570 feet above high water.

In the centre of the island are three peaks, Serra Gorda, the western and highest, at $3\frac{1}{4}$ miles N.N.E. $\frac{1}{4}$ E. from Delgada point, being 1,570 feet. The western portion of the island is higher, the loftiest summit, Pico da Cruz, 5 miles from the north-west extreme of the island, being 2,777 feet above high water; northward of it, at the bottom of an immense crater, is situated Lagoa Grande, an extensive lake, 866 feet above high water, in which the depth is 14 fathoms.†

Generally, the land on the north side of the island slopes gradually to the sea, but on the east, south, and west sides it is more irregular and precipitous. The island is very fertile and produces wheat, maize, beans, fruits and vegetables, and flax, from which country cloth is manufactured; there are numbers of cattle on the island, and wood and water in abundance. The population is about 105,000.

General appearance.—When approaching the north-west extreme of the island from the westward it has a very unpromising appearance, the

See chart No. 1,818.

* See Admiralty chart: San Miguel island, No. 1,854; scale, $m = 0.5$ inch.

† See plan Caldeira das Sete Cidades, on chart No. 1,854.

mountains being barren and the coast formed of basaltic pillars, with a few stunted trees over them: the coast when seen from the southward is more pleasing, consisting of open pastures, vineyards, and cornfields, interspersed with orange trees, &c.

When seen from a distance, owing to the lower land being frequently covered with haze, San Miguel occasionally presents the appearance of being two islands.

Ferraria point, a low dark rugged point, the north-west extreme of the island, is situated at the base of the peak of Camarinhas, the last active volcano of San Miguel, which is 687 feet above high water, and lies one third of a mile from the coast; from Ferrara point, rocks extend a short distance to seaward.

Signal station.—There is Lloyd's Signal Station at Ferrara point.

Sabrina shoal is the site of a volcanic island that, in June 1811, was seen from H.M.S. *Sabrina* to rise from the sea, in an active state of eruption, to the height of 300 feet, and after remaining above water for four months, it gradually disappeared; on the shoalest part, near which H.M.S. *Styx* anchored in June 1841, there is a depth of 15 fathoms. From it Ferrara point, distant one mile, appears in line with the coast south of it, bearing South; and Mosteiros point bears E. by N.

Candelaria point, a high, inaccessible cliff, fronted by a narrow stony beach, lies $2\frac{1}{4}$ miles south of Ferrara point, the intervening coast being cliffy. From Candelaria point the coast trends in a south-south-east direction for $9\frac{1}{2}$ miles in a continuous line of cliffs, descending somewhat in height at Relva, and terminating at Delgada point, which has a shoal, and an islet extending about half a cable from it, and forms the western limit of a bay 9 miles wide and $1\frac{1}{4}$ miles deep, in the western corner of which the city of Ponta Delgada is built.

PONTA DELGADA, the principal city of San Miguel island and commercial capital of the Azores, is situated close eastward of Delgada point; it is well built on a plain, extending about 2 miles along the shore, and, in 1890, contained, including the suburbs, about 17,000 inhabitants. The port is rapidly rising in importance.*

The fort of St. Bras, west of the town, is the principal defence, and close to the northward of it is a large block of buildings containing the convent of San Francisco; half a mile to the eastward the church of San Pedro, a large rose-coloured building, stands near the shore, but probably the most conspicuous building is the prison, also situated on the shore about 4 cables eastward of San Pedro church; it appears like barracks, is painted yellow, and has a white projection in the centre of its sea front.

See chart No. 1,854.

* See plan:—Ponta Delgada on Admiralty chart No. 1,854; scale, $m = 3.9$ inches.

LIGHT.—From a tower, painted red, surmounting an iron structure, painted white, the whole 26 feet in height, and situated on the breakwater in course of construction, a *fixed red* light is exhibited, at an elevation of 47 feet above high water, which should be visible, in clear weather, from a distance of 9 miles. The lighthouse will be moved to the extremity of the breakwater when the latter is completed.

Communication.—There is mail communication twice a month with Europe, by the packets to Lisbon, and every week by a line of steam-vessels trading between London and the West Indies, also, by other vessels calling. Telegraphic communication with Lisbon, and by branch lines to Fayal, Pico, San Jorge, Terceira, and Graciosa. See page 25.

Coal and supplies.—About 14,000 tons of Welsh coal are kept in store at Ponta Delgada, and nearly 30,000 tons were imported in 1896. The stores at the inner end of the breakwater can hold 8,000 tons. Vessels requiring coal should hoist the answering pennant over the flag N of the International code.

Coaling may be performed by lighters; at a wharf, with an available depth at low water of 21 feet; or alongside a coal hulk. About 500 tons a day can be put on board, working day and night.

Supplies of meat, vegetables, and fruit are plentiful.

Water is brought into the town from the mountains by an aqueduct, and is supplied to vessels in floating tanks containing from 1,200 to 2,000 gallons, and fitted with pumps.

Repairs.—Both iron and wooden vessels and steam-vessels can have ordinary repairs to their engines or boilers executed at the foundry attached to the breakwater works. Large vessels, under shelter of the breakwater, have had spare shafts and propellers fitted. Castings can be undertaken up to about $2\frac{1}{2}$ tons in weight. Trained divers may be obtained.

Hospitals.—There is a large hospital, where strangers are readily admitted; and a spacious floating lazaretto in the harbour. There is no Sailors Home.

Breakwater.—The total length of the breakwater, in course of construction, will be 1,255 yards; it leaves the shore near the castle of San Bras, and will extend into a depth of 12 fathoms at low water. The entrance of the harbour between the shoal water extending off the city front and the extremity of the breakwater is about $1\frac{1}{2}$ cables wide.

Towards the latter end of the year 1894 the breakwater in course of construction had attained a length of nearly 1,000 yards; but in the great storm of the 7th of December in that year a breach about 70 yards

long--commencing at about 50 yards inside the head--was made in the breakwater; in 1897 this breach had further extended to a length of about 220 yards. The breach is being repaired and there is about 400 yards of quay-frontage available for shipping.

No vessel should attempt to enter without a pilot. Strong easterly and south-easterly winds occasionally blow for two or three weeks at a time, when it is dangerous for ships to unmoor, as they lie so close together, and winds from the latter quarter send in some swell.

LIGHT BUOY.—A *fixed red* light is shown from the beacon buoy marking the extremity of the submerged base of the breakwater. This light, however, is only lighted when the weather is sufficiently fair to permit vessels to enter. No vessel should pass westward of this buoy.

Bell buoy.—A bell buoy is also moored off the extremity of the submerged portion of the breakwater, which is a guide to vessels, when the light on the foregoing buoy cannot be exhibited.

Warping buoys.—There are two kinds of warping buoys, numbered consecutively, commencing from the entrance to the harbour. Those on the south, or breakwater side, are six in number and painted black; those to the northward, or town side, are three in number and painted red.

Vessels entering the harbour at night, should approach to a convenient distance eastward of the light buoy near the extremity of the breakwater and signal for a pilot.

Steam tugs will render assistance to vessels if necessary.

Custom house and quarantine.—The Custom house and quarantine regulations are the same as in other Portuguese ports.

Trade.—The principal exports consisting of pine apples, oranges, whale oil, alcohol, beans, maize, hides, cattle, and butter, were valued at £162,282 in 1896; the imports of coal, cotton and woollen goods, sugar, wood, iron articles, maize, and wheat, at £62,080; in the same year the number of sailing vessels which entered the port of Ponta Delgada was 157 of 61,592 aggregate tonnage; and 326 steam vessels of 489,637 tons.

Anchorage.—The road of Ponta Delgada off the city has good holding-ground, the usual berth being in from 20 to 30 fathoms water, from three-quarters of a mile to one mile off shore; small vessels anchor nearer in, the soundings decrease gradually, the 5-fathoms line being generally one cable off shore. The entrance points of the bay bear from each other N.W. by W. and S.E. by E., so that the anchorage is exposed to winds from the southward of that line, but steam vessels may ride in 12 fathoms water during ordinary winds, with the south extreme of the breakwater in line with Delgada point, bearing W. by N. $\frac{1}{2}$ N.

See chart No. 1,854.

There are several rocky banks, with from 12 to 15 fathoms water over them, situated on the meridian of San Pedro point at distances of a quarter to half a mile from the shore, and which should be avoided when taking up a berth.

The anchorage of Ponta Delgada is divided into three portions: the offing with free access; the harbour where vessels moor with four cables, either their own or those of the harbour board, paying a fee for the same; and an intermediate portion, where the harbour rules compel the service of a pilot. No ballast, ashes, or dirt is allowed to be thrown overboard in the harbour.

NOTE.—Vessels approaching Ponta Delgada, and waiting for a pilot, should not come within the distance of 4 cables from the lighthouse, in order to avoid the submerged portion of the breakwater. There are no port dues for vessels calling for orders, or putting in in distress, &c.

CAUTION.—If obliged to slip and quit the anchorage to avoid a southerly gale, it is recommended to run to the westward of the island, as S.W. gales generally shift to N.W., which is a fair wind for regaining the anchorage.

Areval, situated 7 cables east of Delgada point, and close east of San Bras fort, is a small basin, with a depth of 10 feet in it, where good landing may be had at all times; here small vessels can be repaired.

San Pedro point, surmounted by a fort, lies 4 cables east from Areval, and midway between on a point in a shallow bight stands the custom-house, to the westward of which there is a small camber with a depth of 9 feet in it.

Shoals.—A shoal, with 6 feet water over it, and a depth of 2 fathoms between it and the shore, lies 100 yards south of the custom-house point; and at a half, and one, cable south-west of San Pedro point, there are shoals with 4 and 3 feet water over them respectively and deeper water between.

Directions.—When beating up for Ponta Delgada road, the rocks off Galera point, its eastern limit, should be given a berth of three-quarters of a mile.

Approaching from the westward, Relva point may be distinguished by a windmill near it, which is somewhat similar to a light tower; also by the Cathedral at Relva village. Delgada point may be known by the tall chimney of a distillery, painted white, and by three windmills; the city prison, a large rectangular three-storied building, painted yellow, is also a prominent object.

Signals.—The signal station is situated on the south side of the castle of San Bras, at the inner end of the harbour. The following signals for communication between vessels and the shore are in use at Ponta Delgada, San Miguel :—

From vessels to the shore :

1. Want a pilot—National flag at the fore with pendant under.
2. Am damaged—Pendant at the fore with national flag under.
3. Have no anchors—National flag at the main with pendant under.
4. Am very leaky—Pendant at the main with national flag under.

From the shore to vessels :

5. Look out for a good place to receive a pilot—Red flag with streamer under.
6. Pilot cannot be sent on board—Streamer with red flag under.
7. Put to sea with the least delay—National flag with red flag under.
8. Can come into the harbour—Red flag.
9. General prohibition to enter the artificial harbour—Black ball with red flag under.

NOTE.—The International Code of Signals is used to communicate with vessels ignorant of the port regulations.

Tides.—It is high water, full and change, at San Miguel island (Ponta Delgada) at 0h. 30m.; springs rise 6 feet.

ROSTO DO CÃO POINT lies E. by S. $\frac{1}{3}$ S., $1\frac{2}{10}$ miles distant from San Pedro point; the coast between is uneven, and fringed with rocks. The point is the extreme of a yellowish bluff, 78 feet above high water, separated from the mainland by a narrow gap which dries at low water, it is “steep-to,” and at one cable off shore the depth is 7 fathoms, over sand.

Port Caetano, Quarantine ground.—In the bight, one mile eastward of Rosto do Cão point, is situated a small port, where vessels, subject to quarantine, anchor in 12 fathoms water, one-third of a mile off shore: or in 29 fathoms, over sand, and at half a mile off shore.

Coast.—From Port Caetano the coast trends in a direct line S.E. by E. for a distance of $1\frac{3}{4}$ miles to Alagoa point and is composed of low-black lava, eastward of which is a landing place in a cove known as port Carneyros: the more extensive bay of Alagoa, with a town of the same name at its head, is situated about a third of a mile to the eastward of port Carneyros.

There is a distillery chimney, situated 150 yards from low water mark, near port Carneyros, which is painted with a black band to distinguish it from the distillery chimney at Ponta Delgada, $4\frac{1}{2}$ miles westward of it.

From Alagoa bay the coast, composed of reddish cliffs with a narrow beach at their base, extends in a south-south-east direction for a distance of $2\frac{1}{4}$ miles to Agoa point, a bold cliff forming the western entrance point of port Cabassos.*

Galera point, a steep rugged point fronted by rocks above and below water, is the south-west extreme of San Miguel island; in port Cabassos, a cove lying northward of it, landing can be effected in front of the Villa do Agoa do Pao.

Pyramida point, lying E. by S. $\frac{3}{8}$ S. distant $2\frac{1}{8}$ miles, from Galera point, is formed by a narrow ridge surrounded by high reddish cliffs and terminating in a remarkable high-pointed rock.

A shoal, having two heads with 6 feet water over them, which break heavily in bad weather, extends south and south-west from Pyramida points for a distance of 2 cables. The coast between Galera and Pyramida points forms a bay half a mile deep, at the eastern part of which there is a beach about a quarter of a mile long.

Villa Franca.--From Pyramida point the coast is nearly straight for 5 miles to Garça point (a small rocky point surrounded by reddish cliffs), where landing may be effected; nearly midway is situated Forca point, to the eastward of which is the town of Villa Franca, of considerable importance. The town has been twice destroyed by volcanic eruptions; in the interior of the island, $3\frac{1}{2}$ miles north of the town, is a crater with 15 fathoms water in it, named Lagoa do Fogo.†

A beach of sand and shingle, about 300 yards long, lies in front of Villa Franca, with rocks and large stones extending a short distance from it.

Supplies.—Water and all kinds of provisions can be obtained at Villa Franca.

Hospital.—There is a public hospital.

Villa Franca islet, half a mile in circuit and about 180 feet above high water, lies 3 cables, S.S.W., from Forca point, with from 3 to $4\frac{1}{2}$ fathoms water between them. The islet is a great natural curiosity, having been a volcano, the summit of which has fallen in, leaving a basin in its centre, with an entrance to it on the north-east side of the islet, fronting the town of Villa Franca; the depth in the basin is 6 fathoms, and the entrance is just wide enough to admit small vessels.

Villa Franca road.—During fine weather small vessels lie between Villa Franca islet and the shore, but there is more space off Forte da Area,

See chart No. 1,854.

* See plan :—Villa Franca road on Admiralty chart No 1,854; scale, $m = 2$ inches.

† A rock has been reported with Galera point bearing S.E. by E. $\frac{1}{4}$ E., distant $1\frac{1}{2}$ miles, and Agoa point N.E. half a mile, but it was not found during the Admiralty survey of 1844.

the eastern limit of the town and roadstead; a good berth is in 10 fathoms water, over sand, with the north-east extreme of Villa Franca islet, bearing W. $\frac{3}{4}$ N., and Forte da Area bearing N.E. $\frac{3}{4}$ N., distant half a mile; it should be borne in mind that from the Forte da Area, rocks, above and below water, extend S.S.W. for a distance of 2 cables.

Lobeira rock.—Lobeira point, a small rocky bluff, lies E. $\frac{3}{4}$ S. distant $2\frac{1}{3}$ miles, from Garça point, and 3 cables, S. by W., from it, is situated Lobeira rock, a few feet above water, with depths of 5 fathoms between it and the point, and 14 fathoms close south of it.

Fayal point lies E. by S. $\frac{3}{8}$ S., distant $5\frac{1}{2}$ miles from Lobeira point, the coast between receding one mile; in this bight is situated the village of Povoação.

Ribeira Quente point, low, narrow, and surrounded by inaccessible cliffs, lies $1\frac{1}{2}$ miles east of Lobeira point; landing can be effected on its east side, and there is a stream of warm water westward of it.

Retorta point, the south-east extreme of San Miguel island, lying 2 miles, E. $\frac{3}{4}$ S., from Fayal point, is high and steep, with a few rocks close to its foot; in the bay between there is a stream and the village of Fayal. Pico de Nunez, 2,220 feet above high water, situated half a mile inland from the point, is conspicuous when seen from the westward. The coast for about half a mile north-east of Retorta point is bold and steep, but not cliffy, on its south-west side there is a landslip fronted by a low cliff.

From Retorta point Formigas rocks bear S. $\frac{3}{4}$ E., distant 33 miles, the channel between being clear.

East coast.—From Retorta point the coast trends north-east for 3 miles to Lombo Gordo point, a steep cliff rising rapidly to a height of 1,347 feet above high water; a few rocks lie close to the foot of the cliffs forming the coast between these points. Marqueza point, a steep cliff 400 feet high, lies $1\frac{1}{2}$ miles, N.N.E. $\frac{1}{2}$ E., from Lombo Gordo point, and Arnel point (which is also cliffy and surrounded at its base by a stony beach of unusual width) one mile further in the same direction; there is an unsheltered bay in front of the village of Nazarete, south of Arnel point.

LIGHT.—From an octagonal-shaped lighthouse, 39 feet in height and painted white, situated on Arnel point, a *fixed* and *flashing white* light, having a period of system of *two minutes* is exhibited, at an elevation of 219 feet above high water; the *fixed* light should be visible from seaward in clear weather through an arc of 240° from a distance of 18 miles; the *flashing* light from a distance of 25 miles.

Signals.—There is a Lloyds semaphore station and storm signals are shown.

Ribeira point, the north-east extreme of San Miguel island, is 280 feet above high water and faced with cliffs; it lies $1\frac{1}{4}$ miles north from Arnel point with a shallow bay between, having a remarkable ravine and a small river in it.

Ajuda point.—From Ribeira point the rocky coast, faced by beaches, trends, in a west-north-west direction, for 8 miles almost in a nearly direct line to Ajuda point, which is low, sharp and “steep-to”; landing may be effected in a cove close eastward of it.

North-east coast.—This side of San Miguel island forms a large bight, $4\frac{1}{2}$ miles deep and 23 miles wide; Bretanha point, its western limit, bearing from Ajuda point, its eastern limit, N.W. by W. $\frac{1}{4}$ W.

Morro Grande point, bearing W. by N. $\frac{1}{4}$ N., distant $8\frac{1}{2}$ miles from Ajuda point, projects $1\frac{1}{2}$ miles from the general curve of the bight; it is a fine bold head faced by cliffs.

The most prominent projections on the cliffy coast between Ajuda point and Morro Grande are Maya point (a double point with a remarkable narrow ledge of rocks extending about 170 yards in a westerly direction from its north-west extreme) and Formosa point, which has a broken rugged coastline.

The square tower of a monastery, 498 feet above high water and about three-quarters of a mile south of Ajuda point, is a conspicuous object on this part of the coast.

Landing in this bight may be effected close east of Maya point (4 miles westward of Ajuda point); at 6 miles west of Ajuda point in a bight close east of Formosa point; also south-east of Morro Grande, under the shelter of Portinha point.

Ribeirinha point, narrow and cliffy, is situated three quarters of a mile west of Morro Grande with a small bay between.

Ribeira Grande, the second town of importance on San Miguel island, is built in the south-east corner of the bight west of Ribeirinha point and $1\frac{1}{2}$ miles distant from it; the population is about 15,000.

Anchorage.—There is anchorage north of this town, in 35 fathoms water, over sand, at a mile from the shore, but, as it is necessary to quit this anchorage with any wind, the town receives its commercial supplies from the towns on the south side of the island; it is only when the sea is very smooth that landing can be effected.

Coast.—Between Ribeira Grande and Fanais point the most projecting points are the bold reddish headland of Morro do Rabo do Peixe, with a shoal of 4 fathoms lying N.E. $\frac{1}{2}$ E. from it distant half a mile, and Calheta point which is low, shelving, and surrounded by rocks.

Fanaís point, a narrow, rocky, yellowish point, projecting 350 yards from the line of coast and with steep cliffs on each side of it, at the head of the bight, lies 7 miles, W. by N. $\frac{1}{2}$ N., from Morro Grande; on the east side of it is a landing place in front of the village of San Pedro.

Morro das Capellas, lying $2\frac{1}{2}$ miles, N.W. $\frac{1}{2}$ W., from Fanaís point, is a small peninsula, faced by perpendicular cliffs much indented by the sea, and westward of it is a bay that affords the best landing on the north-east side of the island; the village of Capellas is situated about half a mile southward of it.

Bretanha point.—From Morro das Capellas the coast, forming the western shore of the bight, trends north for 3 miles to Agulha point (a low rocky point extending from high cliffs) from which Bretanha point, the northern extreme of San Miguel island, 380 feet above high water and faced by steep cliffs, bears N.W. $\frac{1}{2}$ N., distant $3\frac{1}{2}$ miles.

The square tower of a church on a hill at Ajuda, midway between these points, is a conspicuous object on this part of the coast.

Landing may be effected in a cove midway between Bretanha point and Agulha point, at the foot of Pico Vermelho, a conical hill 858 feet above high water.

Lombinah rock, a large flat rock above water surrounded by sunken dangers which usually break, is situated one third of a mile off shore at three-quarters of a mile eastward of Bretanha point; between it and the rocks, which lie close off the coast, there is a depth of 4 fathoms.

North coast.—Mosteiros point, a low projecting point surrounded by rocks, lies W. $\frac{1}{2}$ N., distant 2 miles from Bretanha point, the coast between forming João Bom bay, at the head of which rises Pico da Maffa, useful as a landmark; near the point are some rocks, and southward of it a village; the coast from Mosteiros point extends in nearly a direct line S.W. by W. $\frac{1}{4}$ W. for 3 miles to Ferrara point, the north-west extreme of San Miguel island.

Mosteiros islet, small, dark, and cliffy, lies 5 cables off shore, and is situated one mile, W.S.W., from Mosteiros point; there is foul ground between it and the shore.

Varzea point, situated midway between Mosteiros and Ferrara points, has a reef extending 3 cables northward of it.

CAUTION.—The north coast of San Miguel island should not be approached within a distance of one mile, nor to a less depth than 20 fathoms.

Depths off shore.—On the north and south sides of San Miguel the 100-fathoms line follows the configuration of the island, at an average distance of about $1\frac{1}{2}$ miles from the shore. The soundings on the bank extending from the east coast of the island are somewhat irregular, as at a distance of 5 miles east from Ribeira point the depth is 36 fathoms, with from 50 to 60 fathoms close to it, 90 fathoms is found midway to the shore, and the 100-fathoms line is one mile east from the depth of 36 fathoms.

On the meridian of Villa Franca islet there is a depth of 50 fathoms at a distance of one mile, and 200 fathoms at about 2 miles from that islet.

Off Delgada point the bank deepens from 50 fathoms at one mile, to 200 fathoms at $1\frac{1}{2}$ miles from the shore; whence to the north-west extreme of the island, a depth of 200 fathoms is found from $2\frac{1}{2}$ miles to $3\frac{1}{2}$ miles off shore.

On the bank extending from the north-west extreme of the island, and at one mile off shore, on the site of Sabrina island, is a depth of 15 fathoms; at 5 cables north of this shoal there are 100 fathoms, and at one mile from it, 200 fathoms water.

The bank of soundings extends north-west from Ferraria point, with irregular depths for a distance of $2\frac{1}{2}$ miles; at $3\frac{1}{2}$ miles from the shore no bottom was obtained at 230 fathoms.

Northward of Bretanha point the depth is irregular; at one mile distant there are 22 fathoms water, with 25 fathoms between it and the shore; a depth of 100 fathoms is found at a distance of $1\frac{1}{2}$ miles, and 240 fathoms at about 2 miles from the shore.

SANTA MARIA (SAINT MARY), the south-easternmost island of the Azores, lies 43 miles S.S.W. of the south-east extreme of San Miguel; the island is about 24 miles in circuit and the most elevated part, near the centre, is the double-peaked mountain of Pico Alto, 1,870 feet above high water; it is the summit of a ridge that rises abruptly from the south-east extremity of the island, and terminates at the north extreme; the land on the west side of this ridge falls suddenly, and continues flat to the western extreme of the island, terminating in cliffs about 100 feet above high water. *

Santa Maria is fertile, producing wheat, Indian corn, and other kinds of grain. The principal town and roadstead is situated on the south side of the island, near the south-west extremity.

The aspect of Santa Maria island is on all sides bold; the central peak distinct; the subordinate range high and of varied outline and the coast

See chart No. 1,854.

* *See Admiralty chart:—Santa Maria Island and the Formigas, No. 1,865, scale, m = 0.5 inch.*

abrupt and precipitous, with fallen masses at its base. When seen from the southward, the western part of the island appears as a long low point. The population of Santa Maria island numbers between 7,000 and 8,000.

Castello point, the south-east extreme of the island, is high, and surmounted by a detached peak; off the east and south sides of the point are sunken rocks, but northward of it vessels have anchored in 8 fathoms water, over sand, with the point bearing S.W. by W., distant 5 cables.

Sul rock is a small round islet situated 3 cables west from Castello point and $1\frac{1}{2}$ cables off shore, with 8 fathoms water between it and the coast, and a depth of 12 fathoms close southward of it.

Malha point, lying N.N.E. $\frac{1}{2}$ E., distant two-thirds of a mile from Castello point, is low, black, and fronted by rocks; from this point to San Lourenço bay the coast is clear of off-lying dangers and rises boldly from the sea.

Malha rock, a few feet above water, lies one mile, N.E. $\frac{1}{2}$ N., from Castello point and 3 cables off shore; there is a depth of 9 fathoms in mid-channel between it and the rocky shore.

Feiteira point, bold and rocky with a rock at its base, lies N. by E. $\frac{1}{2}$ E., distant $1\frac{1}{10}$ miles from Malha point; from this point the coast, which is clifty, trends in a N. by W. direction for a distance of 2 miles to San Lourenço islet, the most projecting points of the intermediate coast being Gorda and Cedres points, both of which are high and steep.

Souza point, which is bold and rocky, bears N. $\frac{1}{2}$ W., distant $3\frac{1}{2}$ miles from Feiteira point, the intervening coast receding and forming San Lourenço bay.

A rock which breaks, lies about a cable north of Souza point, and another at the same distance south of it.

San Lourenço islet lies N. by W. $\frac{1}{2}$ W., distant $1\frac{1}{6}$ miles from Cedres point; it is steep and clifty, 275 feet above high water, one-third of a mile in circuit, and half a cable off shore, with a boat passage with 6 fathoms water between; at 100 yards northward of the islet there is a rock, and two small rocks are situated off the south-east extreme.*

San Lourenço bay, formed by Romeiros point (which is high and bold with two rocks above water at its base and situated abreast of San Lourenço islet, and San Lourenço point,) which latter bears North, distant $7\frac{1}{2}$ cables from the islet; the bay is 4 cables deep, its coast generally rocky, with sandy beaches; in the north part are two sandy coves, the

See chart No. 1,865.

* See plan :—San Lourenço bay, on Admiralty chart No. 1,865; scale, $m = 2.9$ inches.

northern of which affords landing. The town of San Lourenço is situated about half a mile westward of the bay.

Anchorage.—The bottom in San Lourenço bay is generally sandy, and the coast “steep-to,” the 5-fathoms line lying 2 cables from the head; between the outer points, the depths are from 9 to 15 fathoms, increasing gradually to seaward; a berth for temporary purposes may be found in from 13 to 15 fathoms water, off the centre of the bay.

Water of the best quality may be easily obtained by digging holes in the sand on the beach; and, generally, from the mountain streams.

Coast.—From San Lourenço point, which is low and cliffy, to Souza point the coast is formed of lofty cliffs.

North coast.—From Matos point, the north-east extreme of the island, the coast, consisting of alternate rocky points and small bays, trends, in a west-north-west direction, for 4 miles to Frades point, which is 150 feet above high water, and appears as an island.

Lagoinhas islet, 277 feet above high water, and surrounded by steep inaccessible cliffs, lies $1\frac{1}{2}$ miles, N.W. $\frac{1}{2}$ W., from Matos point, separated from the shore by a passage 3 cables wide that is blocked by rocks; its north extreme is a low projection from the cliffs, with a depth of 15 fathoms at 3 cables from it, but N. $\frac{1}{4}$ W., distant one mile from it, there is a rocky bank with 6 fathoms water over, and 14 and 20 fathoms around it.

The most prominent points between Lagoinhas islet and Frades point are Ribeira point, a steep bluff 700 feet, and Tamuscal point, which is formed of reddish cliffs, 400 feet, above high water.

Landing may be effected in the bay east of Ribeira point; in the western part of the bay west of Ribeira point, and in the bay eastward of Frades point.

Coast.—The coast trends in a westerly direction from Frades point to Cabrestante point, the north-west extreme of the island, which is low and surrounded by rocks, the outer of which (Maldebarca rock) is above water and lies a quarter of a mile from the shore. From Cabrestante point the coast trends to the south-westward for a distance of about three-quarters of a mile, and rising slightly forms Pendurados point.

The coast from Frades point to Pendurados point is fronted by a bank, with from 2 to 4 fathoms water over it, extending about a third of a mile off, and a rock which breaks, lies 3 cables from the shore, and W. by N. $\frac{1}{4}$ N., distant $1\frac{1}{2}$ miles from Frades point, with a depth of 19 fathoms at three-quarters of a mile north of it.

Landing may be effected to the southward of Pendurados point.

From Pendurados point the coast, formed by cliffs, trends in an almost unbroken line to Villa island.

Villa island, half a mile in circuit, lies off the south-west extreme of Santa Maria island, and is situated $2\frac{1}{2}$ miles, S. by W., from Pendurados point; the island is cliffy, 196 feet above high water, and separated from the shore by a boat passage $1\frac{1}{4}$ cables wide, with 5 fathoms water in mid-channel.*

Villa do Porto bay, which contains the principal town of Santa Maria island, is situated one mile eastward of Villa island; Malmerendo point, its west limit (a cliff 149 feet above high water, surmounted by an old fort), lies 7 cables, S.E. by E. $\frac{3}{4}$ E., from the south extreme of Villa island; and Marvão point (from which a ledge of black rocks extends about 130 yards in a south-westerly direction), the east extreme of the bay, is situated 8 cables further in the same direction.

The bay is 4 cables in depth, contracting to $2\frac{1}{2}$ cables in width at its head, where, to the westward of the town, is situated the castle of Santa Luzia; both sides of the bay are cliffy, the western shore is clear, but the head and east shore are fringed with rocks. Between the entrance points the depths are from 8 to 12 fathoms; the 5-fathoms line is found at $1\frac{1}{2}$ cables from the head; and from the north-east corner, rocks extend one cable from the shore.

LIGHT.—From two iron supports surmounting a small watch-house, the whole 19 feet in height, painted red, and situated on Forca point, 3 cables east of Malmerendo point, a *fixed white* light is exhibited, at an elevation of 151 feet above high water, which should be visible in clear weather between the bearings of E. by S. $\frac{5}{8}$ S., through east and north, to N W. $\frac{7}{8}$ W., and from a distance of 9 miles.

Supplies in moderate quantities may be obtained at Villa do Porto; partridges are generally plentiful.

Anchorage.—The bay of Villa do Porto is quite exposed, and only used in summer by small vessels; the best berth is in 30 fathoms water, over sand, at three-quarters of a mile off shore, with the castle open of Marvão point, bearing North; but the bank is very steep, and the bottom to the eastward rocky; for this reason San Lourenço bay is considered a preferable anchorage.

Tides.—It is high water, full and change, in Villa do Porto bay at Oh. 15m.; springs rise 6 feet.

Prinha bay.—Malbusco point, high and surmounted by a peak, lies S.E. by E., distant $3\frac{1}{2}$ miles from Marvão point, the coast between

See chart No. 1,865.

* See plan:—Villa do Porto bay; scale, $m = 2.9$ inches, on Admiralty chart No. 1,865.

recedes one mile forming Prainha bay, in which the only hidden danger is Pescador rock. The eastern side of Prainha bay is cliffy, the western side is fronted by beaches. From Malbusco point a straight coast extends in an east-south-east direction for $2\frac{1}{2}$ miles to Castello point, before described.

Pescador rock.—A sharp rocky pinnacle, with $3\frac{1}{2}$ fathoms water on it, 20 fathoms between it and the shore, and 140 fathoms one cable southward of it, lies $1\frac{1}{6}$ miles, N.W. $\frac{1}{2}$ W., from Malbusco point, and 5 cables off shore.

Malmerendo point, in line with the north extreme of Villa island, bearing N.W. $\frac{1}{8}$ N., leads one mile south of this rock.

Depths off shore.—On the north side of Santa Maria island the 100-fathoms line lies about 3 miles from the shore, the soundings between being irregular; at 3 miles, N. by W. $\frac{3}{4}$ W., from Frades point, and on the meridian of the north-west extreme of the island, is a rocky bank on which the least depth found was 33 fathoms; at half a mile seaward of this there are 280 fathoms, over sand; and between it and the shore 70 fathoms. Around the other portions of the island the 100-fathoms line lies generally about a mile from the shore.

NOTE.—Sea worms, about 18 inches long, with orange spots on them, are generally numerous near Santa Maria island, and serve to indicate its proximity.

FORMIGAS BANK lies E. by N. $\frac{1}{2}$ N., distant 20 miles, from the north-east extremity of Santa Maria island. The soundings on this bank are very irregular, and traced to the depth of 200 fathoms, it was found to extend 7 miles from north to south, by about 3 miles at its greatest breadth. Between the bank and Santa Maria island no bottom was found at a depth of 320 fathoms.*

Formigas rocks.—Near the north-west margin of Formigas bank lie a group of black rocks, extending in a N.N.E. and S.S.W. direction, about 800 yards in length by 150 yards in extreme breadth.

The southernmost of this group, for an extent of about 350 yards, forms a closely connected cluster of rocks, having a small bay on the west side. The northern rocks are more separated from each other, and the outline of the group exhibits a few hummocks, the southern of which, 27 feet above high water, lies N.E. by E. $\frac{3}{4}$ E. distant 21 miles from Matos point, the nearest point of Santa Maria island.

Hormigon, the most elevated of the group, is 35 feet above high water and stands on the eastern side, about 200 yards from the northernmost rock; it is somewhat more isolated than the others, and slopes to the southward.

* See plans :—Formigas bank and Dollabarat shoal, on Admiralty chart No. 1,865; scale, $m = 6$ inches.

Landing.—With smooth water there is no difficulty in landing, particularly on the southern rocks; but during strong winds or a high swell the sea rolls over them all, leaving a black bare surface entirely devoid of vegetation.

Soundings.—A rocky shoal, partly visible at low water, lies S.S.W. 130 yards distant from the southern Formigas rock, with 15 fathoms water between it and the rock. At 3 cables S.S.W. of the south Formigas rock is situated another small rocky bank with 4 fathoms least water, and “steep-to,” except on a line from it to the Formigas, where the soundings are very irregular, varying from 7 to 14 fathoms.

North of Formigas rocks a ridge extends, in a north-north-east direction, with varying depths upon it but no dangers; at a distance of $1\frac{1}{2}$ cables from the northernmost rock there are 18 fathoms water, quickly deepening to 30 and 50 fathoms. On the meridian of the rocks the 200-fathoms line lies about 2 miles north of them. On the east and west side they are quite clear, with deep water close to, the 200-fathoms line lying not more than half a mile off the west side; at one cable from the rocks there is a depth of 50 fathoms.

Dollabarat shoal is very dangerous in smooth water when its position is not indicated by a breakers, but in stormy weather the sea breaks over it with great violence. Its southern head, consisting of two or three rocky knolls, which, at low water, spring tides, have only 11 feet water on them, lies S.S.E. $\frac{1}{4}$ E., distant $3\frac{1}{4}$ miles from the south Formigas rock. At low water their position is marked by several white patches, which may be distinctly seen, especially when the sun is shining.

This shoal is near the south extreme of a rocky ridge, which extends from it N.E. $\frac{1}{2}$ N. for $1\frac{1}{2}$ miles, at which distance the depth is 20 fathoms, increasing suddenly to 140 fathoms; the ridge is narrow, with uneven soundings of from 14 to 25 fathoms on it.

The whole bank of the Formigas is apparently a submarine mountain, whose varied elevations approach the surface of the ocean in several places. The shoal of Dollabarat is the most southern of these ridges, and the mountain has a steep, but tolerably regular, descent from it to the north-east, east, south-east, and south; the south-eastern slope being the most gradual.

Between Formigas rocks and Dollabarat shoal there are several shoals with depths of from 16 to 30 fathoms on them and 40 to 50 fathoms between them, the least water (16 fathoms) lies S.E. by S. distant $1\frac{1}{6}$ miles from south Formigas rock.

Nature of bottom.—The quality of the bottom over Formigas bank is principally rocky, with frequent casts of fine white sand, broken shells, and small pieces of branch coral.

Reported dangers.—After the survey of Formigas rocks and bank had been completed, much time and labour was spent, under favourable circumstances, in unsuccessfully searching for rocks which had, prior to that time (1843), been reported to exist in the vicinity; the reported position of Tullock reef (about 10 miles E.N.E. from the highest Formigas rock) was carefully sounded over without obtaining any indications of its existence.

See chart No. 1,865.

CHAPTER III.

CAPE SPARTEL TO CAPE BOJADOR.

VARIATION IN 1900.

Cape Spartel - 16° 00' W. | Mazighan - - 16° 30' W.

Cape Bojador - - 17° 55' W.

Decreasing from 5' to 4' annually.

CAPE SPARTEL* (Raz-el-Skukkar of the Arabs), the north-west extremity of Africa, and the south-western limit of the strait of Gibraltar, terminates in a mass of black conical-shaped rock, which, seen either from the north or south, appears detached like an islet. It is commanded by high land which attains an elevation of 1,068 feet above high water, being part of a chain extending east and west; south of the cape the land falls rapidly, forming an extensive plain, in the middle of which is mount Nipple, remarkable by its isolation and conical form.

The cape is skirted by a reef which extends from it for a distance of about 2 cables, and foul ground also extends to the south-westward. With the lighthouse between the bearings of East and E.S.E., the shore should not be approached within three-quarters of a mile. The high land over cape Spartel is conspicuous when bearing S.E., as there are two remarkable grey patches of vertical rock about a third of its height from the summit.†

LIGHT.—Half a mile eastward of the west extreme of cape Spartel, a square white stone tower, 79 feet in height, exhibits, at an elevation of 312 feet above high water, a *fixed white* light, which should be seen in clear weather from a distance of 20 miles; from it the lighthouse on cape Trafalgar bears N. $\frac{3}{8}$ E., distant 24 miles. The lighthouse is in 35° 47' 14" N. latitude, and 5° 55' 40" W. longitude.

Spartel bay.—Half a mile south of cape Spartel is a sandy bay, where small vessels find sheltered anchorage from easterly winds, in 6 or 7

* Chapter III. of this volume, being in part identical with Chapter II. of the Mediterranean Pilot, Vol. I., and with Chapter XII. of the Sailing Directions for the West coasts of France, Spain, and Portugal, the mariner should consider which book contains the latest information.

† See Admiralty charts :—Strait of Gibraltar, No. 142; scale, $m = 0.7$ inch; Africa, Gibraltar strait to Gambia river, No. 1,226; scale, $d = 1.4$ inches; Cape Spartel to Cape Ghir, No. 1,228, scale $m = 0.10$ inch.

fathoms water, at three-quarters of a mile from the beach, but heavy squalls blow off the land, and a continual swell renders landing difficult.

Race.—It is necessary to guard against the tide races, which are sometimes produced by the strong current in the vicinity of cape Spartel.

Signal station.—At cape Spartel, about 300 yards to the south-west of the lighthouse, there is a Lloyd's signal station connected by telegraph with Europe. The signalling is carried on by flags according to the International Code of Signals. The Moorish flag is shown at the station, which is under the care of Moorish soldiers.

Messages from vessels at sea will, at the request of the sender, be forwarded to their destination.

Passing vessels, by simply hoisting their national ensign, with their distinguishing signal of the International code, can be reported by telegram or letter to owners, or to any other person who may have previously applied for such information, at the same time giving their address.

CAUTION.—Open Ports.—The following, within the limits embraced by Africa Pilot, Part I., are the places at which landing is permitted, namely :—Tangier, El Araish, Rabat, Dar el Beida, Mazighan, Safi, Mogador, and cape Juby. Foreigners are not permitted to land elsewhere, and ships, anchoring at other places in Marocco, have been fired at.

Depths off shore.—The 100-fathoms line lies about 3 miles north-westward of cape Spartel, but immediately southward of the cape the bank within that depth increases its breadth to about 20 miles, and the 100-fathoms line continues nearly parallel to the shore for a considerable distance.

Coast.—North of cape Spartel the coast is high and composed of uninterrupted steep cliffs, at the base of which, a little beyond the cape, are some black pinnacle rocks, above water, named the Needles. About $1\frac{1}{2}$ miles north-east of the cape is situated Fraylecite point, at the termination of which is a small black islet surrounded by rocks.

The coast thence turns eastward for 3 miles, with fewer cliffs, but is high and irregular, to Judios point; the most projecting part between being Pigeons point, remarkable and well defined when seen either from east or west.

Judios point is more salient and remarkable than either of the other points, and is known from seaward, rather by the white cliffs that form it than the point itself, which is only well defined when seen from east or west.

The coast between cape Spartel and a point situated one mile east of Pigeons point is "steep-to."

Judios bay, situated nearly three-quarters of a mile eastward of Judios point, has a small sandy beach, which is the only one on this part of the coast. A small stream of the same name runs into it through a narrow valley which separates the mountain of cape Spartel from the Mesa de Marchan (table land of Marchan) which is contiguous to Tangier.

To vessels bound to Tangier, these two heights form good points for recognising the coast, even at night, should the weather be clear. The valley, through which Judios rivulet flows, presents a remarkable break, completely separating the mountain of cape Spartel from Mesa de Marchan, the former being irregular and more lofty than the latter, which is level and only 342 feet above high water.*

On the eastern point of the bay are the ruins of a fort, and a marabut tower stands on the slope of the western portion of Mesa de Marchan.

TANGIER BAY.—A white and reddish cliff commences at Judios bay and terminates at Tangier point, distant one mile to the eastward; when seen from a distance it appears like a patch in the middle of the coast. The shore is here skirted by reefs, and Tangier point terminates in a bed of rocks.

The town of Tangier stands by the sea and on the eastern slope of the table-land at Marchan; its most remarkable objects being the castle (or Kasbah), and a mosque at the north-west angle of the town, the north-east angle being at Tangier point. The houses, standing above each other and being entirely white, are conspicuous, but when approaching from the westward, the table-land of Marchan prevents the town from being seen until abreast of it. The population of Tangier in 1898 was estimated to be 30,000.

There is an isolated conical hill about two-thirds of a mile inland, named mount Direction, which serves as a mark for the anchorage; and a little east of it is situated another hill not so high, on which there is a white tower. Between these two hills winds a small stream, which falls into the sea near the ruins of old Tangier, and is crossed by two bridges, one of which is white; the other nearest the sea is in ruins; another rivulet joins the stream immediately east of old Tangier.

The bay is 3 miles wide and one deep, between Tangier point, its western extremity, and Malabata point its eastern; the latter bears from the former point E. by N. $\frac{3}{8}$ N. Being surrounded by high land, the bay from the offing appears much deeper than it really is; the western part of the shore is a clean sandy beach, with from 5 to $6\frac{1}{2}$ fathoms water at 3 cables

See chart No. 142.

* See Admiralty plan :—Tangier bay, No. 1,912; scale, $m = 3.64$ inches.

distant, but the eastern part is skirted, here and there, by reefs which extend about a cable from the shore.

Tangier point is foul on its northern side for a distance of 2 cables, and eastward and southward of it, for a distance of three-quarters of a mile, the 3-fathoms line is found at a distance of 3 to 4 cables from the shore.

There are two batteries on the eastern side of Tangier Bay; one at the termination of the sandy shore, close to which there is a tower in ruins, and another (Arabi-el-Said) half a mile farther to the north-east.

From the foot of the battery at Tangier point, the extensive bed of rocks which covers at high water, and upon them are the remains of an old mole, extends 2 cables eastward, and affords shelter for small craft from northerly and north-west winds. About $1\frac{1}{2}$ cables further southward is another reef consisting of a group of rocks, one of which is 12 feet above high water.

Between the two reefs is a new jetty which extends from a curved beach, off which the water is shallow, but where small vessels load and discharge cargo; the custom house is situated on the beach. Easterly and south-east winds send in a sea, when the beach cannot be approached without considerable risk.

Tangier.—The town of Tangier (Tanjah of the Arabs and Tingis of the Romans) at the west side of the bay, is enclosed by high walls, and said to be strongly fortified towards the sea, but indifferently so upon the land side.

The streets are narrow, with low and flat-roofed houses, and the chief buildings are the mosque and Saracenic Castle already mentioned; outside the town are the ruins of a bridge stated to have been built by Julius Cæsar. Tangier is the residence of the Consuls-general, the Consuls of the principal nations, and a few European merchants; it is also a favourite winter resort. The gates of the town are locked at sunset.

LIGHT.—From a cylindrical lighthouse, painted white, on the battery at the south-east corner of the sea wall at Tangier is exhibited, at an elevation of 58 feet above high water, a *fixed red and white* light; the light shows *red* from S. by W. $\frac{1}{2}$ W. to W. by S. $\frac{5}{8}$ S. and *white* from W. by S. $\frac{5}{8}$ S. over Tangier road; the *red* light should be visible in clear weather from a distance of 5 miles.

A black vertical line 4 feet wide on the wall of the town, in line with the lighthouse indicates the dividing line between the two colours of the light.

Signals.—A signal mast is situated on the rampart near the lighthouse; if, owing to bad weather, boats are unable to land, vessels can communicate with the shore by the Commercial code.

See chart No. 1,912.

Jetty.—There is a new jetty 1,095 feet in length, and constructed of wood with the exception of 138 feet at the inner end, or approach, which is composed of masonry. The pier head, 301 feet long and 20 feet broad, has a depth of $9\frac{3}{4}$ feet at its extreme end at low water, spring tides; and there is a landing stair, on its inner side, where the depth, at low water, spring tides, is $6\frac{1}{2}$ feet. The pier is provided with a movable crane, also rails and waggons for merchandise, and small steamers can go alongside.

LIGHT.—Near the extremity of the jetty a *fixed green* light is exhibited from an iron frame-work 15 feet in height, at an elevation of 18 feet above high water, which should be visible, in clear weather, from a distance of 2 miles.

Communication.—There is a direct mail from London three times a week, leaving London, *viâ* Cadiz, every Monday, Wednesday, and Friday, and leaving Tangier on the alternate days, Sunday excepted. Steamers of the Papayanni line call fortnightly on their voyages from Liverpool to Malta and Egypt, and there is regular communication with the Moorish ports.

The steamers of Messrs. Forwood Bros. and Co., which call here about three times a month, return to London by the Canaries and Madeira without revisiting the Moorish ports. British and Foreign courier posts are despatched each week to the interior and to the coast ports.

Tangier has daily communication with Ceuta, Gibraltar, and Algeciras; three times a week with Cadiz, Algeciras, and Gibraltar, by the *Compañía Trasatlántica* of Barcelona and once monthly by the same company with El Araish.

There is steam communication with the Moorish ports every month, and irregularly by steamers of various companies.

The Eastern Telegraph unites Tangiers with Gibraltar and England, and there is telegraphic communication with most of the ports on the coast of Algeria as far as Tunis. (*See* page 2.)

Coal and supplies.—The coal hulk, in the bay, is capable of holding about 1,800 tons, but the amount kept in stock is usually about 1,000 tons, the price per ton being 35 francs alongside hulk, and 36·5 francs delivered into bunkers. In calm weather steamers can coal alongside the hulk; otherwise the Government lighters are used.

Fresh provisions in small quantities can be obtained at Tangier, but water is scarce.

Repairs.—There is an engineering workshop where small repairs may be effected.

Tugs—Two steam launches are available for towing lighters.

Hospitals.—Seamen may be admitted to either the French or Spanish hospitals; both are small.

Pratique.—Vessels receive pratique after entering the port.

Trade.—The principal articles imported are cotton manufactured goods, flour, tea and sugar, tobacco, silk, cloth, candles, groceries, and provisions; in 1898 the value was £297,978, and the exports, consisting of eggs, oxen, hides, goatskins, dates, carpets, woollen goods, and birdseed, not including specie, amounted to £228,405. The importation of tobacco, opium, arms and ammunition is prohibited.

The total number of vessels that entered the port in 1898 was 1,028, with an aggregate tonnage of 391,517 tons, of these 305 vessels were British, with an aggregate of 129,194 tons.

Bourée rock, with from 3 to 12 feet water over it, and on which the sea seldom breaks, is about $1\frac{1}{2}$ cables in extent, and lies about half a mile from the south shore of the bay. From its shoalest part, mount Direction bears S.W. $\frac{5}{8}$ S.; White tower (marabut), east of mount Direction, S. by W. $\frac{1}{2}$ W., and fort Arabi-el-Said, East. There is a depth of 2 fathoms, for a distance of about three-quarters of a cable, west and south-east of the rock; from 4 to 7 fathoms water between it and the shore, and about the same depths at half a cable north of it.

Buoy.—A buoy surmounted by a staff and diamond, to mark the telegraphic cable, is moored about 5 cables, N.E. by N., from Bourée rock.

Anchorage.—Tangier bay is the only anchorage of any importance on the south coast of the strait of Gibraltar, which may be used by vessels of any size. Although exposed to winds from N.W. round by north to N.E., it affords security with those from other points of the compass, N.W. winds cause a considerable sea, which is felt even with the wind as far round as S.W.; those between North and N.E. do not last long nor send in much sea.

A vessel may anchor anywhere in the middle of the bay in about $7\frac{1}{2}$ fathoms water, over sand and good holding ground, with mount Direction bearing about S. by W. $\frac{1}{2}$ W. A large vessel should keep Judios point open of the fort in ruins, on the east point of Judios bay, bearing about N.W. by W. $\frac{1}{2}$ W., and also Europa point open of Malabata point, about N.E. by E. $\frac{3}{4}$ E. Small vessels anchor nearer the shore. During the winter months vessels should be prepared to leave quickly.

A vessel entering Tangier bay during an easterly gale will find convenient anchorage off a small beach about a mile southward of Malabata point, in 8 or 10 fathoms water, where there is better shelter than further

See chart No. 1,912.

westward, and it is a fair position from which to continue the voyage when the wind slackens or changes.

The 3-fathoms line in this eastern portion of Tangier bay lies at a general distance of about 2 cables from the shore, but at $1\frac{1}{6}$ miles south of Malabata point $2\frac{3}{4}$ fathoms is found at nearly 3 cables from the coast; east and west of which and more in the centre of the bay are two shoals with $4\frac{3}{4}$ fathoms water on them. When working out of the bay and standing towards old Tangier, keep Europa point open north of Malabata point, bearing N.E. by E. $\frac{3}{4}$ E., to avoid Bourée rock.

Malabata point, at the eastern extremity of Tangier bay, is a bold prominent headland terminating in cliffs bordered by rocks, which extend $2\frac{1}{4}$ cables from it in a south-westerly direction; it has on it a battery and a cylindrical tower, painted white, the land rising from the point to an elevation of 792 feet.

Almirante rock, with from $3\frac{1}{2}$ to 5 fathoms water on it, lies N. $\frac{3}{4}$ W., distant 7 cables from the tower on Malabata point; there is generally a swell, and with strong winds from the westward the water breaks. Between Almirante rock and the shore there are from 9 to 12 fathoms water; no large vessel should, however, use this channel except in cases of necessity, but pass Malabata point, at a distance of a mile, in from 12 to from 15 fathoms water.

Tides.—It is high water, full and change, at Tangier point at 1h. 42m.; springs rise $8\frac{1}{4}$ feet, neaps 5 feet.

Tidal streams.—The flood stream in the offing north of Tangier bay runs from east to west, and the ebb in the reverse direction, turning in mid-channel at high and low water by the shore. Three hours after it is slack water in the offing or at about half ebb by the shore at Tangier, the ebb stream within the bay runs from east to west or in a direction contrary to the offing stream. Northward of Tangier the tidal stream is strong, causing eddies resembling breakers both on the flood and ebb, however little sea there may be; this occurs more especially during spring tides.

JEREMIAS ANCHORAGE, about $3\frac{1}{2}$ miles southward of cape Spartel, is much resorted to by vessels prevented from entering the strait of Gibraltar by strong easterly winds. At a mile from the shore there are about 20 fathoms water, over clean sandy bottom, and good holding ground. During the prevalence of easterly winds it is preferable for vessels wishing to enter the strait to keep over on the African coast rather than the Spanish, as it is free from danger, and they are in a better position to profit by any change in the direction or force of the wind; for this purpose it is prudent for a sailing vessel to keep under sail.*

See chart No. 1,912.

* See chart No. 142.

Directions.—When approaching the strait of Gibraltar from the westward if a levanter comes on, stand well to the southward, and work up to bring mount Nipple, about 3 miles south of Cape Spartel, to bear E. $\frac{1}{2}$ N. before anchoring. From this position to the southward heavy squalls are not generally experienced. A good berth may be taken up in 24 fathoms water, and at half a mile from the shore there are 7 fathoms.

H.M.S. *Vulture* in 1872 anchored at Jeremias anchorage in 14 fathoms water, with a white marabut tower (the only building in the vicinity), bearing S.E.

CAUTION.—There is a depression in the land south of cape Spartel, which might be taken for the entrance to the strait of Gibraltar at night when the low land cannot be seen. This error may be avoided by attention to the soundings.

COAST.—From cape Spartel the coast trends nearly straight in a S.W. by S. direction for 20 miles to Arsila, and, with the exception of a few rocky projections, is formed by a clean sandy beach with a line of low hills, which, from the distance of half a mile inland, elope gradually to the beach. Thirteen miles further inland there is a range of very conspicuous mountains, the loftiest of which, named Jebel Habib, is about 3,000 feet above high water and makes a good landmark for Arsila. Mount Raven, another peak, lies 6 miles farther northward and 10 miles inland, and is about 2,200 feet high. Both of these peaks are of a regular conical form.*

Arsila.—Close north of the town of Arsila there is a Portuguese castle, now in ruins; date trees, which rise above the walls, are growing in the court. Under the southern angle of the castle is a whitewashed tomb of a Mohammedan saint. The country in the neighbourhood of the town is well wooded, and a great part of the land is laid out in gardens.†

Anchorage.—There is good anchorage on this part of the coast; a convenient berth is in 15 fathoms water, over a bottom of sand and small shells at $1\frac{1}{2}$ miles from shore, with cape Spartel bearing N.E. $\frac{5}{8}$ N., and the town of Arsila S. by W. $\frac{5}{8}$ W. distant 5 miles; further to the southward, in 13 fathoms, coral rock will be found mixed with gravel, when the centre of Arsila town bears about South, distant $2\frac{1}{2}$ miles.

CAUTION.—It is against the law of Marocco for any person to land on a part of the coast where there is not a port for their reception; a list of open ports will be found at page 104.

* See chart No. 142.

† See Admiralty chart:—Cape Spartel to Cape Ghir, No. 1,228; scale, $m=0\cdot10$ inch.

† See view of Arsila on chart No. 1,228.

COAST.—From Arsila the coast continues in a general S.W. by S. direction, and presents nearly the same appearance, the depths, at a distance of 3 miles from the shore, being from 25 to 30 fathoms over gravel. At 4 miles south of Arsila the coast hills rise to a height of about 700 feet above high water. Haffat-el-beida, or the White cliff, situated 8 miles south of Arsila, stands about 300 feet above high water, and presenting in all directions the form of a wedge, serves to identify this part of the coast. The face or section of this cliff shows the strata lying at an angle of 70° with the horizon.

EL ARAISH.—About 8 miles south-west of White cliff is situated El Araish, on the steep southern point of the Wadi el Khos (the bow), which here winds through a fertile valley; the sudden bends in the river having probably suggested its Arabic name. A large castle on the summit of the hill, a lofty mosque, and several towers, give this town an imposing appearance when seen from seaward; this, however, soon vanishes on approaching it.*

The environs are laid out in gardens, from whence the town derives its name (El Araish, signifying a pleasure garden), but they are in a very wild uncultivated state; the population of El Araish is about 4,000, but no census is taken.

Communication.—Monthly steamers of the *Compañía Transatlántica* of Barcelona, from Barcelona, via Tangier, continuing to Mogador, calling at intermediate ports; the Mersey Steamship Company's steamers, from London and Gibraltar, call every ten days during the summer months; and the Woermann line of German steamers call monthly.

Supplies, in moderate quantities, can be obtained, but no coal.

Landing even in the fine season is difficult and dangerous; it is effected in surf boats.

Bar.—On the bar at the entrance of Wadi El Khos at low water there is a depth of 5 or 6 feet, deepening inside to 24 feet; the bar is stated to be continually shifting, and it would appear that in dry seasons the channel is sinuous, whereas with heavy rainfall the river makes a straight and deeper course over the bar.†

The river takes an abrupt turn to the northward, and vessels moor in the bend. In February 1890 several vessels were waiting at Gibraltar for the bar at El Araish to be washed clear by the rains: a succession of gales in the Atlantic having caused such a heavy surf, that it was feared the channel, across the bar, no longer existed.

* See plan:—El Araish with view on Admiralty chart, No. 1,228; scale, $m = 1$ inch.

† Remark book, Navigating Officer H.M.S. *Arethusa*, 1894, and H.B.M. Consul, 1896.

Trade.—In 1898 the value of the exports from El Araish amounted to £66,730, and that of the imports to £164,688. In the same year 144 vessels, including steam-vessels, of all nationalities, entered the port. The aggregate tonnage was 62,973 tons. The exports consisted of bird seed, wool in grease, hides, slippers, goatskins, and ghazul (saponaceous earth); the imports, of manufactured cotton, sugar, tea, and woollen cloth, candles, iron, steel, &c.

Quarantine.—Vessels are liable to quarantine; pratique is given at the anchorage.

Anchorage.—The best anchorage in the outer road of El Araish, for vessels intending to enter the river, is about a mile off shore, in 12 fathoms water, over a sandy bottom, with a conical mountain, named Jebel Sarsar, distant 25 miles, appearing in the centre of the entrance, bearing S.S.E. $\frac{1}{8}$ E.; or in 10 fathoms with the north entrance point bearing S.E. by E. $\frac{1}{2}$ E. distant about $1\frac{1}{4}$ miles. The pap, or rising ground, on the north side of the river, is 200 feet above high water.

Tides.—It is high water, full and change, at El Araish at 1h. 30m.; springs rise from 9 to 12 feet.

OLD MÁRMORA.—About 21 miles south-west of El Araish is situated the outlet of a stream reported to flow from a small inland lake; on the north point of the entrance there are several tombs kept well white-washed, the most prominent of which is named after Mulair-Abu-Sallūm.

Though the coast is straight, there is tolerable anchorage off this river during the summer; at 2 cables from the bar there is a depth of 5 fathoms, gradually increasing to 34 fathoms, at 2 miles off shore. The coast between El Araish and Old Mármora is generally about 300 feet above high water, with reddish cliffs for the northern 10 miles, and then sand-hills partly covered with brushwood.

Rocky (Artlett) shoal, with 8 fathoms water over it and 13 fathoms between it and the shore, lies 15 miles south-west of Old Mármora and one mile off shore. From it Black rock bears E. by S. $\frac{3}{4}$ S.

Mehediya or New Mármora lies 60 miles south-west from El Araish, the town standing on the lower slope of a hill which rises to the height of 456 feet, on the southern bank of the Wadi Sebu. It is celebrated for its ruins, but the population, about 400, are not friendly to Europeans; they subsist by the sale of a species of shad, named shebbel.

Wadi Sebu, the largest river on this coast, rises in the midst of a forest, near the foot of the Atlas mountains, eastward of Fez and Meknās, and after winding through the plains, passes within 6 miles of Fez; thence flows, with numerous eccentric bends, through the Sebu valley to the sea, a distance of about 205 miles from Fez; its general course being, approximately, from north-east to south-west.

The bar is said to have not more than 6 feet water on it, and a writer, in the early part of this century, describes the river as being, at the mouth, as wide as the Thames at Vauxhall Bridge. In the lower plains (covered with ruins dating back to the period of Roman occupation) the breadth is stated to be from 110 to 330 yards; at the ferry passage of Bel Ksiri, on the Tangier road, 218 yards, with depths of 10 feet in April, and 2 feet in September; and at another ferry passage named Sidi el Hadj abd es Selam (in lat. $34^{\circ} 20' N.$, long. $5^{\circ} 25' W.$, approximately) 120 yards with a depth of $5\frac{1}{2}$ feet in June; at about 100 miles from the mouth depths of from 14 to 16 feet are reported.

For some distance below Fez the river, in August, is described as having, in no spot, more than 6 inches of water; the river bed sloping, in places, several feet in a few hundred yards, forming shallow rapids, which, with a flooded river, might cause serious impediments to navigation. Near Fez, where the river is about 100 yards wide, it is crossed by a bridge of good structure; here, in July, it was very shallow, easily forded, and had numerous stony islets.

The valley of the Sebu is richly cultivated: figs, olives, melons, and vines growing in great profusion, while the remainder of the land is used for grain. The river is subject to risings, during thaws, when its muddy and reddish coloured water (caused by the clay bed) overflows its high banks and the surrounding country. This populous and fertile valley has, at present, no maritime outlet; if the bar could be dredged, canals constructed, and a proper system of navigation established, it would doubtless highly develop the agricultural as well as the commercial prosperity of the country, but the constant hostility of the tribes, along the sides, might for some time interfere with safe navigation.

Anchorage.—Good anchorage may be obtained off Wadi Sebu during summer, there being a depth of 16 fathoms, over muddy bottom, at a distance of 2 miles from the shore, but in winter S.W. and S.S.W. winds render it unsafe.

Depths off shore.—Vessels, approaching the land in the latitude of Mehediya, will strike soundings in 100 fathoms, over coarse sand, when distant about 18 miles from the shore, and shoal to 50 fathoms at the distance of about 8 miles from the coast.

Current.—During a calm, vessels are at times obliged to anchor, in order to avoid being drifted on shore, by the current setting along the coast to the southward. The sea is discoloured for a long distance off shore, abreast of the entrance of the river.

Coast.—From Mehediya the coast trends in a south-west direction, generally resembling that before described, but is rather more level, and wooded.

SALI.—At a distance of 17 miles south-west of 'Mehediya' the town of Sali, or S'la, stands on the northern bank, and near the mouth of the Wadi Abú Regreg. It is encompassed by a wall 35 feet high, strengthened and flanked by towers at regular distances; at this south-west angle there is a casemated battery.*

Rabat.—The town of Rabat extends along the opposite or southern bank of the Wadi Abú Regreg, and is larger than Sali. The population of both together is estimated at 21,000.

Rabat is defended by fortifications which extend round the river and sea faces of the town. Both towns are remarkable for their white walls and minarets.

Communication.—Monthly steamers of the *Compañía Transatlántica* from Barcelona, viâ Tangier; steamers of the German Woermann line, monthly, and the Mersey Steamship Company's steamers, every 10 days, during summer.

Supplies.—Beef, chickens, and vegetables can be procured. Soles are caught at the mouth of the river.

Trade.—The value of the imports during the year 1898 amounted to £111,861, and that of the exports to £42,536. The exports were chiefly wool, woollen goods, and goatskins; the imports principally cotton goods and yarn, loaf sugar, tea, cloth, and woollens, and candles. During the year 1898, 92 vessels of all descriptions and nationalities, with an aggregate tonnage of 54,526 tons entered the port. Nearly all of these were steam vessels, which had to anchor outside.

Hassan tower, situated south-eastward of the town of Rabat, is 180 feet in height, and, standing on a cliff which rises 70 feet above the river, may be seen from a distance of 15 or 20 miles.

Anchorage.—The best anchorage in Rabat road is with Hassan tower just open of the south entrance point of the river, bearing about S.S.E. $\frac{1}{4}$ E., and 2 miles from the shore, in 21 fathoms water, over mud, or a steam vessel in fine weather might anchor, in 10 fathoms water, at $1\frac{1}{4}$ miles off shore, with Hassan tower in line with the east angle of the fort, S.S.E. $\frac{3}{4}$ E.

Depth on bar.—A sand-bank which dries at low-water is situated at the mouth of the Wadi Abú Regreg. The bar is dangerous to any but the smallest coasting vessels, and at spring tides has not more than $6\frac{1}{2}$ to $7\frac{1}{2}$ feet of water on it, except in a narrow tortuous channel, which only a steam-vessel could navigate; the channels are liable to changes.†

H.M.S. *Arethusa*, 1894, found this bar more dangerous than that at El Araish; boats could only get out of the river within an hour of high water.

See chart No. 1,228.

* See plans:—Rabat and Sali with view, scale, $m = 1$ inch; on Admiralty chart No. 1,228.

† The sand-banks at the mouth of the river are reported to have considerably increased.

Landing.—There is always a heavy rolling swell on the bar, but with the aid of local pilots it may be crossed in two places; it is, however, very dangerous, as the banks constantly shift, and cause the loss of many coasting vessels. Landing is effected in lighters kept by the Government, ordinary boats being unfit for the purpose.

Tides.—It is high water, full and change, at Rabat at 1h. 46m (approximately); springs rise 9 to 12 feet.

COAST.—The first conspicuous object, situated 7 miles south-west from Rabat, and built on the slope of a hill, is Massa tower, 190 feet high; and 22 miles further to the westward the little town of Mansuria will be seen, the principal mosque of which is 180 feet in height.

The coast between Rabat and cape Fedala slightly recedes, but the inland features scarcely vary in appearance; two lines of barren and gently undulating hills running nearly parallel to the coast. The distant hills are from 200 to 400 feet above high water, and lie 5 or 6 miles from the sea, while the coast range is not more than 200 feet in height, nor more than a mile from the beach, on which many patches of rock are intermixed with the sand, and down to which they gradually slope.

Depths off shore.—From Rabat to cape Fedala there is no danger at a distance of 3 cables from the shore and the bank of soundings to the 100-fathoms line is upwards of 20 miles in breadth and tolerably regular. At 22 miles north-west of Rabat there is a depth of 162 fathoms, whence towards the shore it suddenly shoals to 90 and 80 fathoms, between which depth, and that of 60 fathoms, the bottom for many miles is of fine sand and mud.

Banks.—N.E. by E., distant 6 miles from cape Fedala, there is a bank with a depth of 17 fathoms, from which others extend about 9 miles, in an east-north-east direction, parallel with the shore, and at a distance of about 3 to 4 miles from the coast. The least water on these banks is 15 fathoms, and there is deep water between them.

CAPE FEDALA.—Five miles west of Mansuria is situated the village of Fedala, with a projecting cape to the westward of it, which, when seen from a short distance, has the appearance of an island, and affords some shelter to the small bay in front of the village.

Anchorage.—Vessels may anchor there in 5 or 6 fathoms water, but very near the shore; the anchorage is dangerous with winds from North to West.

Cape Dar el Beida, bearing W. by S. distant 13 miles from cape Fedala, has reefs extending from it to the distance of nearly half a

mile, and further off, northward of the cape, there is a rocky bank with 6 fathoms water over it; a safe distance at which to pass the cape is 3 miles.

DAR EL BEJDA, also generally known by the name of Casa Blanca, was once a place of importance, and the adjacent country is said to be very fertile; the population is about 8,000, of whom about 200 are Europeans. The town is surrounded by a wall, about 30 feet high, having a tower at each corner; the streets are narrow and dirty, but, owing to the good climate, the place is generally healthy.*

LIGHT.—A private harbour light (not to be implicitly relied on) is exhibited from an iron tripod on the flat roof of a warehouse at Dar el Beida. It is a *fixed white* light, with a sector showing *red* westward of S.S.W., over West reef, and should be visible from a distance of 7 miles in clear weather.

Communication.—There is communication with London by the Mersey S.S. Co.'s steamers, which return *viâ* Canaries and Madeira; with Hamburg by Woermann and Oldenberg lines; with Cadiz by Compañía Trasatlántica; the above all monthly. With Marseilles by steamers of N. Paquet & Co. twice a month, these latter steamers and those of the Woermann line usually call monthly at the Canary islands. Postal and telegraphic communication by land to Tangiers; newspapers and parcels by steamers. (*See* page 2.)

Supplies.—Provisions, the only supplies to be obtained by shipping, are plentiful and cheap. Money exchange is calculated by Spanish pesetas.

Landing.—The landing place is a narrow entrance, with a sandy bottom about 40 yards wide, with reefs on either side, over which the surf breaks in almost all weathers. To enter the gut, leading to the landing place, steer for the minaret until the small gateway can be seen through the main gateway, then steer for the sand patch just to the westward of the gateway. If it blows at all hard from the west or N.W. all communication between the shipping and the shore is cut off. Gales from W.S.W. are said to cause the heaviest sea.

Quarantine is strictly enforced, and no communication with the shore permitted until pratique has been obtained.

Trade.—In the year 1898 the value of the exports at Dar el Beida was £281,247, and of the imports £211,461; the former consisted of peas, greasy wool, beans, hides, goats, skins, and eggs, and the latter sugar, cotton manufactures, tea, hardware, and candles. The number of vessels of all nationalities which entered the port was 224, with an aggregate tonnage of 150,048 tons.

* *See* plan of Dar el Beida; scale, $m = 1$ inch, on Admiralty chart No. 1,228.

Anchorage.—Northward and eastward of cape Dar el Beida the bottom is rocky in many parts of the bay between it and cape Fedala; this must be a very unsafe anchorage during the winter, not only from its foul bottom, but from the current, which sets obliquely on the shore, rendering it difficult for a sailing vessel, when weighing, to clear it with an on-shore wind. The best anchorage is in 12 or 13 fathoms water, with the British Consular flagstaff in line with the gate, shown on the plan, bearing S.W. $\frac{1}{4}$ S. It is not safe, during winter, to remain over night in less water, as the sea breaks heavily nearer in shore.

COAST.—From Dar el Beida the coast runs nearly straight in a W. $\frac{1}{2}$ S. direction for a distance of 35 miles to Azimur point, the eastern 2 miles being rocky, but the rest a broad sandy beach, inside of which two parallel ranges of hills, of 300 and 400 feet in height, rise at the distance of 2 and 6 miles from the sea, and are partially covered with brushwood. Several tombs are seen on this part of the coast.

Azimur.—At Azimur point the coast suddenly bends southward to the mouth of the river Wadi-um-er-Rebia (mother of Libage), on the south bank of which, and 120 feet above high water, stands the town of Azimur.

Bar.—The river has a bar of sand across its mouth, which dries nearly across at low water; on the inside it is reported to be deep and rapid.

Azimur spit, about two miles to the westward of the entrance of the Wadi-um-er-Rebia, is reported to have extended from 4 to 5 miles to the westward; in bad weather, with on shore winds, the sea breaks in the bay inside the 12-fathoms line and heavily over the Azimur spit.

Effect of refraction.—Lieutenant Arlett, R.N., remarks: "As we approached the town towards sunset, it was refracted through the haze into a magnificent looking place, and a tomb in the centre of the town had the appearance of a stately cathedral; but the morning light showed all to be mere heaps of ruins."

Cape Mazighan.—From cape Mazighan a reef extends more than a mile to the north-eastward, with shoal water beyond it. This reef, which in 1882 was reported as extending further off, somewhat shelters the anchorage for small craft in westerly winds, notwithstanding which a heavy swell rolls in.

A shoal, with 4 fathoms water over it, gravel bottom, lies east from the north extreme of cape Mazighan distant $1\frac{1}{3}$ miles from the shore; vessels should not attempt to pass between this shoal and the coast.

MAZIGHAN.—The small town of Mazighan stands on a low rocky point, about three-quarters of a mile south of cape Mazighan, and 8 miles

westward of Azimur, the coast between forming an extensive bay. The town, or rather fortress, of Mazighan, known to the Moors as Burjah (fortress), is well situated for defence, being nearly at the extremity of the cape. The fortifications are of a quadrangular form.*

The British Consulate occupies the site of one of the four flanking towers. The chief tower, about 150 feet high, is conspicuous from seaward. In 1897 the population was about 10,000, including some 3,000 Arabs outside the walls.

The mosque containing the tomb of Sidi Musa, and consisting of a cupola attached to a house, about 20 feet in height, is situated S. $\frac{3}{4}$ E., distant $1\frac{1}{4}$ miles from the town, and, showing very white, forms an excellent mark.

Communication is by British, French, Spanish, and German lines of steam-vessels from and to London, Marseilles, and Hamburg respectively. (*See page 2.*)

Supplies.—Beef, mutton, and poultry are abundant and cheap, fish and vegetables of excellent quality are easily procurable; a limited supply of water, obtained from wells, can be brought by a hose into the custom house; no coals nor ship's stores can be supplied. The current money is the Spanish peseta.

Dog fish and a species of ray sometimes inflict wounds on bathers, which are not easily healed.

Landing is difficult at low water, but may be easily effected after half flood in a camber on the east side of the town; here lighters load and discharge, there being a crane which will lift 3 tons.

Quarantine is strictly enforced in time of epidemics on vessels arriving from infected countries.

Trade.—The value of the exports during the year 1898 amounted to £187,099, and of imports to £136,942; the former consisted of beans, eggs, wool, garbanzos, maize, almonds, &c., and the latter, loaf sugar, cotton goods, tea, candles, and woollen cloth. In the same year 178 steam and 45 sailing vessels entered, of an aggregate tonnage of 140,300 tons. Spanish five franc pieces and pillar dollars are chiefly used.

Directions.—The depths in Mazighan bay, eastward of the anchorage, are considerably less than shown on the chart. A depth of 4 fathoms was found with cape Mazighan bearing N.W. by W., distant $1\frac{1}{10}$ miles, and the minaret W. $\frac{1}{4}$ N.

Cape Mazighan should not be approached nearer than two miles, and if coming from the southward, care should be taken not to mistake the ruins of Tett for the town of Mazighan. The mosque of Sidi Musa should be

See chart, No. 1,228.

* *See plan of Mazighan, scale, $m=0.75$ inch on chart No. 1,228.*

brought to bear S.W. until the tower on Mazighan fort bears West, which leads to a good anchorage, in 7 fathoms water, over mud and sand, about $1\frac{1}{4}$ miles from the town, which should not be approached nearer than that distance in a ship of heavy draught.*

Further eastward, in the eastern portion of the bay, the general depths are from 7 to 10 fathoms over fine dark sand, but this would be a wild and dangerous anchorage during winter. The sands on the south-east side of the bay are said to be of a shifting nature, and wrecks are not uncommon.

In 1895 H.M.S. *Arethusa* anchored in 7 fathoms water with cape Mazighan bearing W.N.W., distant $1\frac{7}{10}$ miles, and the minaret W. $\frac{1}{4}$ S.

Tides.—It is high water, full and change, in Mazighan bay at 1h. 33m.; springs rise 10 to 13 feet.

Coast.—Between cape Mazighan and North cape Blanco, distant 9 miles in a S.W. by W. $\frac{1}{4}$ W. direction, the coast should not be approached nearer than 2 miles, as detached rocks lie off the shore, and the soundings are very uneven. The beach also, though in many places a broad sand, is generally fringed with rocks.

A barren range of hills, 200 feet above high water, slope to the beach throughout its extent, and terminate close northward of cape Blanco, in a low, dark, and rocky cliff. At about 4 miles north-east of cape Blanco are the ruins of the ancient city of Tett, among which a tower 128 feet high, and 148 feet above high water, is conspicuous from the offing.

NORTH CAPE BLANCO, in latitude $33^{\circ} 9' 30''$ N., longitude $8^{\circ} 38' 20''$ W., probably derives its name from a white cliff, 170 feet above high water, a little southward of the headland that forms the cape; it is named North cape Blanco to distinguish it from the other cape of the same name situated in latitude $20^{\circ} 47'$ N.

Anchorage.—The bight on the south-west side of North cape Blanco is reported to afford a temporary anchorage, but only for summer use.

Depths off shore.—At 19 miles, N.W. $\frac{3}{4}$ N., of North cape Blanco, a depth of 111 fathoms, over gravel, will be found, and at 22 miles N.W. by W. from the cape there is 100 fathoms, over broken shells, from whence it shoals gradually to the shore.

Tides.—Spring tides rise about 10 feet.

CAPE CANTIN.—From a position 3 miles north-west of North cape Blanco, to 3 miles north-west of cape Cantin, that rises precipitously

See chart No. 1,228.

* It is stated that there are two high towers in the town, easily distinguished, which in line, bearing W. $\frac{3}{4}$ S., lead to the anchorage.

200 feet above high water, the course is S.W. by W. $\frac{1}{4}$ W., and distance 47 miles. Cape Cantin is known as Ras-ul-Hadik or Palm grove cape.

Four miles southward of North cape Blanco a dark cliff projects from the shore, which when seen from some directions has an insular appearance. About 6 miles south-west of North cape Blanco the hills rise gradually from the beach to the height of 450 feet above high water, and appear to be the highest land on this part of the coast.

About 10 miles south-west from the cape, near the coast, there is a black tower with some ruins near it; and 21 miles further to the south-westward, the ruins of El Waladieh may be seen on the shore, with a smaller group of ruins $2\frac{1}{2}$ miles south-west of them. Here there is said to be an extensive lake, communicating with the sea, but the boats of H.M.S. *Raven* during the Admiralty survey in 1835 did not discover the entrance; it was probably concealed by the high surf which breaks upon this forbidding shore.

At 4 miles north-eastward of cape Cantin, the profile of the land, which is here about 450 feet above high water, begins to lower gently, but close to the cape it again rises into a hummock, on the outer edge of which there is a white patch, seen both from the northward and southward, and apparently the site of a former town. A singular gap in the ridge of the cape is also seen when either north-east or south-west of it.

Westerly swell.—Between cape Spartel and cape Cantin allowance should be made for a heavy swell that generally sets directly on the coast.

Depths off shore.—At 16 miles to the westward of cape Cantin, soundings may be obtained in 100 fathoms over fine sand; and 11 miles westward of cape Cantin depths of from 40 to 45 fathoms, over sand and shells, decreasing irregularly to the cape, from which a reef or sandy spit extends to seaward for a distance of $1\frac{1}{2}$ miles, with 5 fathoms on its extremity; at 3 miles W.N.W. from the cape the depth is only 17 fathoms.

Tides.—Spring tides rise about 10 feet at cape Cantin.

CAPE SAFI, the northern point of Safi bay, bears S. by W. $\frac{3}{4}$ W., distant 12 miles from cape Cantin; the intermediate coast is a continuous line of white cliff with a broad sandy beach at its foot; the cliff gradually rising to the height of 500 feet at cape Safi, which may be known by a square tower, said to be the tomb of a celebrated Moorish saint.

Safi bay.—At cape Safi the land suddenly recedes to the south-eastward forming Safi bay, and the cliff drops into a ravine, the bed of a winter torrent. On the slope of the hill which rises from the south side

of this ravine, stands the town of Safi, or more properly Asáfi, a place of considerable antiquity and importance, which has a population of about 8,000.

The town may be distinguished from a distance by the whiteness of its walls and buildings. The towers of the principal mosque have an elevation of 200 feet. Water is scarce, and during the summer it has to be procured from wells at a short distance southward of the town. The country in the neighbourhood appears from seaward to be sandy and barren, but travellers assert that it is remarkably fertile.*

Communication.—Steamers of the Woermann and Oldenburg lines call monthly on their passage south; and the steamers of the former line touch fortnightly going north.

British steamers usually call fortnightly on passage south, but are unreliable.

Supplies.—Limited supplies of food may be procured, but pratique must be obtained before communicating with the shore.

Landing.—The landing at Safi is bad at all times, and even with a perfectly smooth sea should not be attempted, except in a surf boat.†

Trade.—During the year 1898 the value of the imports amounted to 71,988*l.*, and that of the exports to 117,290*l.*; the former consisted of loaf sugar, cotton goods, tea, and candles, and the latter beans, wool, goat and sheep skins, and canary seed.

During the same year 96 steam and 12 sailing vessels entered the port, with an aggregate tonnage of 79,689 tons.

Anchorage.—Safi bay, although entirely exposed to westerly winds, affords, during the summer months, good anchorage, with smoother water, than at any of the other anchorages on the coast of Morocco; the bottom is composed of sand and mud, and there is generally a depth of about 15 fathoms at a mile from the shore, shoaling gradually to 5 fathoms at a few yards from the rocks. Small steam-vessels, if prepared to quit at a short notice, may anchor off the town, with the citadel on the highest part of the town bearing E. by S., distant one-quarter of a mile.

WADI TENSIFT.—At 7 miles southward of Safi, a red cliff, named Sharf-el-Yahudi, or Jews cliff, rises to a height of 283 feet above high water. Ten miles further south-westward is the mouth of Wadi Tensift, the principal river of Morocco; the general features of the coast throughout the space between Safi and Wadi Tensift are high sand-hills, sometimes terminating in low cliffs and occasionally in sloping points, backed by hills above 600 feet above high water, covered with brushwood; Wadi Tensift,

* See plan of Safi bay; scale, $m = 0.75$ inch on chart No. 1,228.

† Remark book, Navigating Officer, H.M.S. *Arethusa*, 1894.

though a considerable river in the interior, had, in the month of August 1835, its bar entirely dry at low water. On the northern bank of the river there is a castellated building in ruins.

Coast.—From Wadi Tensift the coast trends in a S.W. by W. $\frac{1}{4}$ W. direction for a distance of 9 miles to the tomb of Sidi Abdalla Bettak ; and further on, other tombs with the ruins of a town will be seen at the base of the Iron mountains. The coast, which from Wadi Tensift is barren and uncultivated, and from 200 to 300 feet above high water, here shows renewed signs of cultivation.

Jebel Hadid, or the Iron mountains, a large mass of high land extending more than 20 miles in length, rises to the height of 2,300 feet ; and on one of its summits the tomb of Sidi Wasman forms a very conspicuous object, useful in recognising the land, and verifying the position of a vessel.*

Hadid point.—At 45 miles south-west from cape Safi is situated a sandy spit named Hadid point, which projects a mile beyond the general trend of the coast, terminating in a reef half a mile in length ; at $1\frac{1}{2}$ miles west of the point the depth is 8 fathoms.

Coast.—From Hadid point the sandy beach continues in a south-west direction for a distance of 12 miles to Mogador ; the view inland being bounded by the high Botof sand-hills, covered with dark bushes, which extend parallel to the beach at about a mile inland.

Depths off shore.—At from 6 to 7 miles from the coast, between Safi and Mogador, the depths are from 20 to 25 fathoms, whence it gradually decreases to the shore, except off Hadid point.

Soundings in 100 fathoms may be obtained at a distance of 22 miles from the shore, on the parallel of Mogador, eastward of which the water almost immediately becomes discoloured ; from the depth of 78 fathoms the soundings decrease gradually, the 50-fathoms line being about 8 miles from the shore.

MOGADOR.—When approaching the land on the parallel of Mogador, the first remarkable features which are seen are the distant craggy summits of mount Atlas, capped with snow, and contrasting with the dark ridges of intermediate hills ; while to the northward, the Jebel Hadid, or Iron mountains, appear like a large island. On a nearer approach to the shore, a narrow white streak of sand-hills, fringed at the top with verdure, seems to rise out of the sea ; and at the distance of 8 or 10 miles, the mosques and castles of Mogador begin to be distinctly seen, as well as the low black island which fronts it.†

See chart No. 1,228.

* See view on chart No. 1,228,

† See Admiralty plan :—Suïra or Mogador Harbour, No. 1,594 ; scale, $m=4$ inches.

Town.—Mogador, or Suïra, dates only as far back as 1760, when the Sultan Mohammed Ben Abdalla, having been attracted there by the wreck of a European vessel, laid its foundations. Unlike those of any other town in his dominions, they were planned by a Genoese architect, with some little attention to convenience and regularity ; and the effect was so pleasing that it received the name of Suïra or the Beauteous Picture ; it is however, better known to Europeans by its more ancient name of Mogador.

The town stands on a low sandy spot, which is surrounded by the sea at high-water, spring tides, and the adjacent ground is therefore a swamp ; the streets are narrow and the houses have flat roofs, and are generally kept in good state of repair.

Mogador consists of two parts, the citadel, and the outer town, in which is the Jews' quarter, isolated and enclosed by a wall, with forts at the principal angles. In 1898 the population was estimated at 18,000.

Communication.—The vessels of the Mersey Steamship Co., from London, call weekly, touching at Gibraltar and the ports on the coast, and returning viâ the Canary islands and Madeira ; vessels of the French Compagnie de Navigation Marocaine, fortnightly, which leave Marseilles, calling at Gibraltar, continuing to the Canary islands and thence back by the Marocco coast ; steamers of the Companiá Transatlántica from Barcelona, viâ Tangier, monthly ; and two German lines from Hamburg at irregular intervals.

Coal and supplies.—There is no coal for sale at Mogador, but a small and very uncertain quantity is sometimes held by the Moorish Government and by Messrs. Paquet & Co., for the supply of their own steamers ; vessels coal in the bay, from lighters, with baskets.

No ship's stores nor furniture can be obtained nor repairs executed. The market is excellent ; provisions of all sorts, including poultry and game, can be procured in moderate quantities, and cheap, as is also fruit, but vegetables are sometimes very scarce. The price of beef is regulated every day by a superintending officer.

The hook and line fishermen of Mogador, when not stopped from working, as they often are in summer, by strong north-easters, and in winter by southerly and westerly weather and heavy seas, make fair catches of various bream, with conger and muræna, skate and thornback, bass and mullet, and many other fish, both European and local. Crayfish, lobsters, and large prawns are plentiful, and soles and turbot of excellent quality are caught in nets.

Fresh water.—Formerly there was a great want of water, as the river is a mile and a half distant, but an aqueduct now conveys the stream to several large tanks built in different portions of the town. One of these

has been placed very conveniently for the vessels in the harbour, as it lies close to a jetty inside the fortified bridge ; and boats may fill there towards high water, perfectly sheltered from all winds.

Quarantine.—Strict quarantine is enforced in time of epidemics, on vessels coming from infected countries.

Landing.—Boats may land at high water alongside at the sea gate, or they may pass under the bridge and reach a more convenient landing place on the other side ; but at low water the whole place is dry, and then the landing is on the reef. These must all be approached through a channel between the reefs to the southward. When there is not enough water to land at the custom house, a small dredged channel, a little to the eastward, can be used by small boats.

Trade.—In 1897, 148 steam and 3 sailing vessels entered, of an aggregate tonnage of 121,455 tons. Imports were valued at £146,190, and exports at £231,210. The imports consist of cotton goods, loaf-sugar, tea, candles, cloth, earthenware, hardware, hides, iron ; the exports chiefly of goatskins, gums, almonds, olive oil, beeswax, and beans.

Except for the Moorish government, the importation of tobacco, opium, arms and gunpowder is prohibited ; and the exportation of live animals, wheat and barley, and weapons of all kinds.

Mogador island, about half a mile long and a quarter of a mile broad, lies half a mile from the opposite beach, and three-quarters of a mile south-west of the town ; it rises about 94 feet above high water, and except upon the eastern side is surrounded by extensive detached islets and reefs, which extend $3\frac{1}{2}$ cables from its west extreme : the shores are cliffy and defended by several batteries.

A high islet, nearly joined to Mogador island, lies off its north-east extreme, and immediately north-east of this islet there is a rock above water.

Mogador harbour, or, as it is generally termed, Mogador bay, is formed by a double bight in the coast line ; the northern part of which is somewhat sheltered from the long Atlantic swell by Mogador island.

The wreck of S.S. *Verité* (iron hull), lying S. $\frac{1}{2}$ E., distant $4\frac{1}{2}$ cables from the Fort (ruin), had in 1898 from $2\frac{1}{2}$ to 3 fathoms water over portions of it ; vessels should anchor well clear to the south-westward of the wreck, no portion of which is visible, and therefore a danger to navigation.

Buoy.—The position of the wreck is marked by a conical buoy, painted green, which is moored with the Fort (ruin) bearing N. $\frac{1}{4}$ W., distant $4\frac{1}{2}$ cables.

Anchorage.—The actual extent of the anchoring berths is of small dimensions; vessels generally haul close in to the eastward of the middle of the island, and anchor at little more than half a cable from the shore, and therefore in only 14 or 15 feet at low water, over a loose sandy bottom. A more central position in the bay and in deeper water would be directly open to the swell of the Atlantic, which occasionally sets in with great violence, even in moderate weather.

The greater facilities for discharging cargo induce merchant vessels to anchor in the eastern part of the harbour, well under the shelter of the rocks that extend off the town. With the prevalent north-east wind, this northern entrance is so distinct as to require no further directions than to keep in mid-channel.

North entrance.—The north entrance affords a clear channel, about 3 cables wide, with from 4 to 6 fathoms water in it; but in the harbour the depth decreases to 3, 4, and at the most 5 fathoms, over a rocky bottom with only a superficial covering of sand, and the clear space for anchoring is contracted, to little more than half a mile square, by reefs extending from the town point, and by the 2-fathoms flat which extends from the shore to Mogador island.

The sanctuary of Sidi Mogodol, kept on a S.E. $\frac{3}{4}$ S. bearing, leads through the north entrance.

South entrance.—The bight southward of Mogador island is never used as an anchorage, but vessels, of not more than 12 feet draught, find it more convenient to cross the flat between the island and mainland, and to run out in that direction with the benefit of the current, than to work out through the northern entrance.

The lead will be a sufficient guide not to deviate much from midway between the island and the opposite shore, in passing through this south channel; or the great mosque of Mogador, standing near the beach, in line with a house with an angular roof (the only one in the town), bearing about N.E. $\frac{1}{4}$ E., leads across that flat in the deepest water.

This channel is said to be filling up.

CAUTION.—Vessels should moor in Mogador harbour, with a very short scope of cable and open hawse either to the northward or southward, according to the season of the year. From November to April this bay can scarcely be considered tenable, although it has often been asserted that vessels with good ground tackling need be under no apprehension. The nature of the bottom, however, shows that no reliance can be placed on the hold of the anchors; and the necessity of veering more cable to a westerly gale, will increase the exposure of the vessel to the effects of the

swell which rolls round both extremes of the island, and which again reacts from the opposite shore.

In case of parting from the moorings in a gale it would be very difficult to save the vessel or even the crew.

Anchorage for steam-vessels.—A good berth for small steam-vessels is in $4\frac{1}{2}$ fathoms water, with the north-east extreme of Mogador island bearing W. $\frac{1}{4}$ N., and the ruined battery on the mainland, south of Mogador island, S.S.W.

Mogador road.—Vessels of more than 14 or 15 feet draught would find it imprudent, unless in fine summer weather, to anchor in the harbour; and if intending to remain but a short time, anchorage can be obtained outside Mogador island, but open from S.W., round by north, to N.E. by E., and at all times exposed to a long swell, but comparatively safe in summer.

A good berth is in 13 fathoms water, over fine dark sand, good holding ground, with the fort west of the custom house bearing S.E. by E., and the rocky points at either extreme of Mogador island S. by E. $\frac{1}{4}$ E., and S.W. by S. This roadstead is three-quarters of a mile from the shore, and the pilots consider it the best outer anchorage, though the holding ground is loose; it is the most suitable for large vessels at all seasons.

CAUTION.—During the winter months, S.W. winds spring up with but slight warning, rendering anchorage in the road dangerous; and with the first sign of more than an ordinary swell setting in, especially with a falling barometer, an offing should be sought, for in moderate weather a swell sometimes breaks heavily across the entrance, making it difficult to get out, even with steam.

Tides.—It is high water, full and change, in Mogador harbour at 1h. 18m.; springs rise 10 or 12 feet. The tides are generally regular in their rise and fall, but the direction of the tidal stream varies with the wind, and its strength is at all times weak.

CAPE SIM, or Ras Tegriwelt, lying 8 miles south-west of Mogador, is a low sandy point, sloping gradually from a height of about 500 feet above high water and terminating in reefs of rocks which extend from the point to the distance of nearly a mile; it should not be approached within a distance of 2 miles. The intermediate coast between this and Mogador is a continuous line of bare sand-hills, 70 feet above high water, sloping to the beach. The Botof sand-hills north-east of Mogador, which are covered with a dark evergreen cap, are visible from the offing.*

Wadi Tidsi.—Seven miles southward of cape Sim the Wadi Tidsi issues through a picturesque ravine; and not far from thence is situated

See chart No. 1,554.

* See chart No. 1,228.

the village of Koleï'at. From Wadi Tidsi to cape Tefelneh, bold cliffs, apparently of sandstone, rise from the shore, and at 7 or 8 miles in the interior there is a range of hills between 2,000 and 3,000 feet above high water.

Cape Tefelneh lies 18 miles, S. by W. $\frac{1}{2}$ W., from cape Sim ; it rises to a height of 700 feet above high water, and terminates in a point, from which a ledge of rocks extends for a distance of half a mile, with deep water close outside it.

Depths off shore.—At 6 miles west of cape Tefelneh the depth is 40 fathoms, whence it shoals gradually to the shore, except to the northward where a reef extends some distance from the cape, and where the water should not be shoaled to less than 20 fathoms.

Anchorage.—There is reported to be anchorage ground in 10 fathoms water, over sand, under the south side of cape Tefelneh, with shelter from East and N.E. winds.

Cape Ghir, or Ras Aferni, projects boldly into the sea at 29 miles S.S.W. from cape Tefelneh ; the hills inland of the intermediate coast rising to the height of nearly 3,000 feet above high water, and the country appearing, from its numerous villages, to be well inhabited, with several conspicuous tombs and scattered woods. The cape shows a bold bluff face, but slopes gradually on each side from the summit, which is about 1,200 feet above high water.*

AGADIR OR SANTA CRUZ.—The town of Agadir or Santa Cruz stands on the summit of a hill about 600 feet above high water, bearing S.E. by S., distant 18 miles from cape Ghir ; the deep bay which intervenes offers a convenient anchorage, during the prevalence of north-easterly winds. Agadir is much nearer than Mogador to the province of Sus, whence comes a large supply of almonds and gum, and to which goes a considerably quantity of piece goods.

The beach is rocky from the cape to Wadi Tarmarakt, which enters the sea through a fertile valley, about 6 miles northward of Agadir. The hilly region which backs this part of the coast, and known as the Heights of Idantenan, is the western extremity of the chain of mount Atlas, and rises at 9 miles north of Agadir to the height of 4,400 feet above high water.†

Immediately south of Agadir is situated the small fishing village of Fonti, where there is a boat harbour.

See chart No. 1,228.

* See Admiralty chart:—Cape Ghir to Garnet head, No. 1,229 ; scale, $m=0\cdot07$ inch.

† See plan of Agadir or Santa Cruz, on chart No. 1,229.

Supplies.—The bay is well stocked with fish, vast shoals of aslmsah, averaging about 30 lbs., enter the bay, and making long halts, large quantities are caught, dried, and sent to Mogador and to the interior; the population is scanty, the appliances for curing are limited, and transport difficult, but it is the only trade which is pursued at Agadir. Mackerel are also caught. Provisions are good and plentiful, and water easily procured.

Anchorage.—The bay of Agadir affords good shelter from north-easterly winds, but is exposed to those from the westward; the depth of water is moderate. Convenient anchorage will be found with the castle bearing N. by E. $\frac{3}{4}$ E., in 7 or 8 fathoms water, and about a mile off-shore. This is one of the best roadsteads for shipping along the coast of Morocco.

Tides.—It is high water, full and change, at Agadir at Oh. 45m.; springs rise about 9 feet.

COAST.—Immediately southward of Agadir a very low and flat country commences, and extends for 28 miles in a south-west direction.

River or Wadi Sus, rises at the foot of mount Atlas, discharges into the sea at 5 miles southward of Agadir, and has a bar of sand extending across the entrance, which is nearly dry at low water, and cannot, at high water, be entered by a vessel drawing more than 4 or 5 feet.

Seven springs.—From the river Sus the same description of sandy coast continues to the south-westward; at the distance of 7 miles are the Suwanieh, or wells of fresh water, also known as Tomieh, or the Seven springs. The anchorage off this place differs in no respect from that which can be found off almost every part of this coast.

Depths off shore.—At the distance of 17 miles west of Suwanieh there is a depth of 86 fathoms, over dark sand; at 6 miles, 40 fathoms, over sand and mud, decreasing gradually to the beach.

Wadi Mesa.—At the distance of 12 miles south-west of Suwanieh there is a little river, named Wadi Mesa, with a bar of sand across its entrance which dries at low water; it is said to have been formerly navigated by the Portuguese, and occasionally the depth both of the Sus and Mesa, is said to be 2 feet at low water.* At a short distance within the bar, on the northern bank, there is a village; and to the southward, near the beach, an ancient castellated building.

COAST.—Cape Agulá, in lat. $29^{\circ} 50' 30''$ N., is only a slight projection of the coast line; a decided change, however, in the appearance of the coast begins at this point, for though the beach, with a heavy surf

See chart No. 1,229.

* Mr. J. W. Elton, H.B.M. Vice-consul at Mogador.

breaking on it, continues as to the northward, its bare appearance is now superseded by a series of green hills, which, as they approach the sea, form cliffs of sandstone, about 100 feet in height.

At a considerable distance inland there is a range of mountains, about 2,000 feet above high water, and much of the neighbouring country appears to be wooded, cultivated, and well inhabited. The houses, which are built of dark red brick or clay, are numerous, and some are large and surrounded by farm buildings. The village of Agulá stands on a hill, about a mile from the beach of a small sandy bay, into which the Wadi Assa falls.

Twelve miles south-west of Agulá the features of the country again alter; the hills resume their abrupt and barren appearance, and form successive ridges, gradually increasing in height till they join the line of distant mountains, which as well as could be estimated, attain the height of nearly 4,000 feet above high water, and appear to be the south-western extremity of the offsets of the Atlas range.

Still further to the south-westward these bare hills and the broad sandy beach give place to dark red cliffs, broken into little bays and coves, in some of which boats (the first seen southward of Agadir) were hauled up. From the number of villages this part of the coast seems to be populous.

The principal settlements appear to be at Wadi Sidi-ben-Nuar and Sidi-abu-el-Fedail, situated 9 and 12 miles respectively south of cape Agulá; at Garizim, the mouth of a small river situated 20 miles south-west of Agulá; and at Salmagat, where there are some small wells situated a little north of Wadi Assaka.

At Wadi Ifni, situated 30 miles south-west of cape Agulá, a small white tomb near the shore is conspicuous, and near this, at a height of 300 feet above high water, is situated the village of Idufker.

Wadi Ifni, which is dry during the summer season, affords a landing place in fine weather.

At $4\frac{1}{2}$ and $6\frac{1}{2}$ miles south-west of Wadi Ifni are situated two mountain torrents, known as Wadi Tasret and Wadi Kweraima, with a few houses near them.

Jorba or Sok Ensara is the name of a deep ravine where there are the ruins of an ancient mole; it lies in lat. $29^{\circ} 14' N$.

Sugar-loaf mountain.—In lat. $29^{\circ} 22' N$. there is a remarkable white cliff, the singularly curved and irregular strata of which, with a solitary conical mountain inland, 3,900 feet above high water, shaped like a sugar-loaf, form good marks for recognising this part of the coast.

Depths off shore.—North-west of the white cliff, at a distance of 20 miles from the shore, there is a depth of 100 fathoms, over broken

shells, outside of which the bank drops very suddenly ; nearer the shore the depths decrease rapidly to 60 fathoms. At 5 miles from the coast there are from 24 to 28 fathoms water, over coarse sand ; and from thence the depth decreases more gradually to the beach.

Wadi Assaka.—In lat. $29^{\circ} 10'$ N. a little bay, at the entrance of the Wadi Assaka, lies between two steep rocky points ; the water in it is deep, and the bottom clean up to the beach ; and though it affords no shelter for large vessels, yet landing may generally be effected there in the fine season.

The northern entrance point has on it a conspicuous white mark, which, from a distance has the appearance of a vessel's sails, and a small conical hill is situated on the right bank of the river close to the shore ; further inland on the same parallel there is an isolated peak, named Fogo, 2,970 feet above high water.

Climin, the chief town of Wadi Assaka, lies 3 or 4 miles to the north-east of the river, and immediately north of the town the Wadi Siad flows past it ; when the snows in the mountains of the Anti-Atlas melt, it becomes a large contributory to the Assaka.

COAST.—South of Wadi Assaka, the coast is clifty, intersected by several ravines, but in lat. 29° N. the mountainous country terminates, and a sandy desert commences ; here there is a small stream known as Wadi Busefen, with some cliffs, 115 above high water, near its mouth, and a little to the northward an isolated sugar-loaf hillock, the last on the south seen on this part of the coast ; thence the coast, having a W. by S. direction for 17 miles to the Wadi Aureora, is known as Playa Blanca.

A flat-topped chain of mountains, known as the Table of cape Nun, runs parallel to this coast, from which it is distant about 10 miles. From Wadi Aureora the coast, preserving the same direction for a further distance of 12 miles, is formed by bold sandstone cliffs, with sandy downs in the interior, some rare cacti forming the only vegetation.

The tract of country between Agadir and cape Nun offers great encouragement to commercial enterprise, and secure establishments might be maintained, which would amply remunerate an enterprising speculator. The inhabitants near the river Sus are well disposed towards Europeans ; and the short distance of this river from the provinces, where most of the valuable products of Barbary are raised, would facilitate a profitable trade.

The province of Sus is described as being peculiarly fertile and populous, and the inhabitants are less bigoted, and more friendly towards Christians, than the Moors generally are. The real obstacle which opposes itself to opening a trade with this port of Marocco is the absence of secure harbours, or, indeed, of any tranquil anchorage.

Cape Nun or los Moretes, in lat. $28^{\circ} 45' N.$, presents a steep face of sandstone about 170 feet above high water; but as the cliffs, for some distance on each side of it, are nearly of the same elevation, and the country inland an uninterrupted sandy desert, it is difficult to distinguish the exact projection till very near it.

Depths off shore.—The water is deep close to the shore, there are no off-lying dangers, and the depth gradually increases from the extreme of the cape to the distance of 4 miles, where there are 30 fathoms water, over reddish sand; at 12 miles, 50 fathoms over dark sand; at 20 miles, 57 fathoms; and at the distance of 30 miles from the coast, 85 fathoms, over coarse red sand and shells; further out the water deepens suddenly.

Discoloured water.—For some distance, both north and south of cape Nun, as well as to seaward, the water has a red tinge, with a thick muddy appearance, so that the track of a vessel is visible for some time.

This discoloration of the water may have alarmed navigators with the apprehension of shoals, and so account for the alleged existence of a bank off the cape; but it is evidently occasioned by the immense volume of very fine sand which is blown off the desert, and with which everything on board soon becomes coated, even when many miles from the shore. The water also of the river Nun, and of other streams which here discharge, and which are also all laden with this sand or dust, project it a long distance out to sea, till it is met by the current and dispersed.

Wadi Draa or Nun river, which falls into the sea 5 miles southwest of cape Nun, has been given a variety of names by different authors and travellers: Wadi Nun by Borda, Assaka or Akassa by Jackson, Schlcema by Wilshire, and the Soliman by Davidson; that of the Wadi Draa or Nun river has been retained from its proximity to the cape of the latter name. The valley of the Wadi Draa is very fertile, producing large quantities of barley and other cereals, also dates, vegetables and fruits. The land on the right bank is remarkably white and the summit clearly defined, sloping down gradually to the river.*

The mouth of the Wadi Draa, which is about 60 yards wide, was completely closed by a sand-bank in 1886. Shebbel are sometimes so numerous in the river as to impede each other's movements.

Wadi Draa, when well open, may be recognized by two hills, which will then appear in the centre of the gap; they are both conical, and on one of

See chart No. 1,229.

* An attempt was made in 1886 to establish trade with the Moors at this river; the boat, however, capsized, and in a subsequent dispute two of the crew were killed by the Moors, and the remainder confined in prison till rescued by the intervention of a friendly chief.

them, which is about 300 feet above high water, there are some ruins said to be those of a Spanish fortress.

West of, but near the entrance of the river, fresh water filters through the sand, and here commences a sandy plain, about 50 feet above high water, with large sand dunes about 5 miles from the coast.

Anchorage.—The holding ground is good off this river, but the anchorage is unsafe between the months of November and March.

Coast.—At 11 miles south-west of cape Nun is the mouth of a torrent known as Saibajarsa, and at 21 miles from that cape a reef of rocks, partly uncovered at low water, forms a boat harbour, locally known as Meano or Uina, about half a mile long and 2 cables wide, with depths in it of 3 fathoms in some places.

This harbour can be entered by boats, either through a channel among the reefs, or between the south extreme of the breakers and the mainland.

The coast between the Wadi Draa and Wadi Shibika, is formed chiefly by sandstone cliffs, above which the table-land, apparently of limestone formation, just shows, when seen at the distance of 3 miles from the shore; there is a regular depth of 20 fathoms and good anchorage ground at that distance, which anchorage, however, is not safe before March nor after October.

Wadi Shibika.—About 32 miles south-west of Wadi Draa, and in about lat. $28^{\circ} 19' N.$, there is another river of about the same magnitude, to which the name of Wadi Nun was formerly applied, and probably correctly, as the town of Nun is said to stand on its banks. Singularly enough the features of the coast adjacent to the mouth of each river are very similar, so that their latitudes become the best guides to distinguish them that can as yet be given.

In the Wadi Shibika, the southern, there appeared to be water enough for large boats, which it is said trade there from Lanzarote island, but, at the time of the survey, the surf prevented any attempt to cross the bar in order to examine the interior. The water is said to be brackish for 17 miles above the entrance, and near the mouth, the river is stated to be about 330 yards wide.*

When approaching Wadi Shibika, the table-land breaks into detached hills, which will help to identify it; the highest of these hills rises about 900 feet above high water.

Commerce.—If any attempt should ever be made to open a direct trade with this part of Marocco, either of these rivers would offer an eligible situation for a factory, as there appears to be sufficient evidence that inside

See chart No. 1,229.

* Scottish Geographical Magazine, March 1897, p. 114.

the bars there is ample room and depth for vessels of some burthen ; that favourable opportunities for crossing the bars are frequent ; and that the rivers are navigable for large boats for a considerable distance up the country. The inhabitants of the coast between Wadi Draa and Wadi Shibika are Arabic nomads of the plains.

COAST.—At 6 miles west of Wadi Shibika there is a rivulet named Um es Sabed ; at 14 miles the mouth of the Wadi Uдеми Fatma, which is nearly 150 yards broad, the dry river bed being deep, with bushes growing in it ; and at 20 miles the Rio Sabar, the banks of which are covered with red sand.

From Wadi Shibika the coast and inland features of the country continue the same, in a westerly direction, for a distance of 30 miles, to a headland known as Punta del Morro, the cliffs being about 120 feet above high water ; but there they terminate, and a low sandy beach surmounted by sandhills, of which the northernmost is the highest, extends for the distance of 11 miles to Porto Consado.

The southernmost of these hills, named Gord el-Jamar, is conspicuous, being composed of red sand.

Porto Consado.—The entrance to this inlet, across the bar, is about half a mile wide between the sandy shore, to the south-east, and a long narrow sandy islet to the north-west, with from 2 to 3 fathoms water in the channel, the water then deepens to 6 and 4 fathoms in the bay inside, which widens out to 2 miles and extends for about 4 miles, terminating in some cliffs ; at the head of the bay there is an opening, nearly 400 yards wide, leading into an inner but smaller sheet of water, having an old tower and a wall in ruins on its shores.

There is an outer bar at about 2 miles seaward, and it is stated that a tremendous surf breaks on the shores, also that the entrance to the harbour is silted up. June and July are the worst months for surf on the bars ; the best time for boats crossing is from low water to half flood.* A flat hill, 400 feet above high water, between Porto Consado and the back land, is its only distinguishing mark.

Nothing can be more dismal than the appearance of the shore in this locality ; for many miles there is not a dark spot to be seen to break the monotonous appearance of the sand, the fine particles of which, mingling with the haze occasioned by the heavy surf, render the coast very indistinct.

COAST.—Cape Juby bears W. $\frac{3}{4}$ S. distant 108 miles from cape Nun, the coast between receding about 12 miles, the mouth of the Wadi Shibika being the point where the indentation is deepest.

See chart No. 1,229.

* From a sketch and remarks by W. J. N. Graham, Esq., July, 1889.

For a distance of 10 miles westward of Porto Consado there are large sandy spaces, which terminate near Ajfeuir point; thence cliffs, from 90 to 100 feet in height, again commence and continue for several miles; they consist of dark sandstone, and the bottom is also of dark sand, which gives a dark greenish appearance to the water. Inland, a flat desert extends as far as can be seen, but there is no beach, the sea breaking against the cliffs, on which it appears to be gradually encroaching.

Where the cliffs terminate, the country becomes broken into sand-hills, partly covered with bushes, and the coast trends in the direction of W. $\frac{2}{3}$ N. for a distance of 15 miles to cape Juby, which is 37 miles from Porto Consado.

Water.—About a third of a mile from the coast, brackish water, which may be used for drinking purposes, can be obtained.

CAPE JUBY, a low sandy point, terminating in a hillock, 40 feet above high water and covered with bushes, from all directions seaward makes as an island. Shoal water extends nearly half a mile from the cape, the 5-fathoms line being about that distance from the land; and in addition to a fringe of rocks extending about a cable from the cape, an outlying ridge, about 6 cables in length and drying 4 feet, lies parallel to the shore, from which it is distant about a third of a mile.*

Near the south-west extremity of this ridge, and W. by S., distant 8 cables from cape Juby, there is a fort, 37 feet above high water, and between the ridge and the shore lies a channel about a cable in width, with depths of from one foot to 6 feet in it; at low water the mainland can be reached from the fort crossing this channel. The flagstaff of the fort is in lat. $27^{\circ} 56' 41''$ N.; long. $12^{\circ} 56' 5''$ W. Gazelle, red-legged partridges, and hares may be shot in the vicinity of cape Juby.

LIGHT.—From the flagstaff of the fort a *fixed white* light is exhibited, at an elevation of 46 feet above high water, which should be visible, in clear weather, from a distance of 7 miles. This is a private light and unreliable.

Communication with the Canary islands is by a schooner: Las Palmas being the headquarters of the North-West African Trading Company.

The dwellers in the immediate neighbourhood are reported to be well disposed; but formidable tribes from a distance occasionally visit cape Juby on marauding expeditions. Cape Juby is 150 miles from the nearest caravan track, and is the southern boundary of Morocco.

See chart No. 1,229.

* The fort and North-west African Trading Company's establishment were transferred to the Moorish Government in 1895. See plan of cape Juby anchorage; scale $m = 3$ inches, and view on chart No. 1,229.

Water.—The subsoil water lies from 3 to 10 feet below the surface in the neighbourhood of cape Juby; although brackish, the natives drink it freely. All round cape Juby are depressions containing salt.

There are no supplies to be obtained here. Water and fresh meat are obtained from Lanzarote.

Landing.—The landing place is at the steps of the fort on its eastern side, but during high tides with on-shore winds, the surf breaks heavily all round the fort, rendering landing impossible even in fine weather. Care is necessary when approaching the landing place to avoid the shoal water extending a cable south from the fort.

Trade.—There is a large square stone building on the mainland used as a storehouse for carrying on trade, which chiefly consists of the barter of cloth for wool, yielded by sheep pastured in the vicinity.

Anchorage.—H.M.S. *Sylvia* anchored in 8 fathoms water, over sand and broken shells, at about 4 cables north-west of the fort, the depths regularly deepening to 10 and 14 fathoms, at three-quarters and one mile respectively from the coast.

Between the ridge of rocks and the shore is a shallow basin, which is entered east of the fort over a bar having 2 feet water on it, and with some winds only one foot; this small basin is reported to be silting up, and the bank on the south side extending. On the arrival of H.M.S. *Espiegle* it was stated to be the first day, during the previous two months, that it had been possible to communicate with the fort, and that a schooner of 25 tons had not been able to get out of the basin.

Though it is quite smooth water inside the ridge at low tide, it could not be considered to afford permanent shelter even for small boats, as the sea must be dangerous during a gale at high tide. Before attempting to enter the basin behind the reef, the state of the surf should be carefully noted.

Directions.—The fort stands up well from seaward, appearing black and square, and may be recognised at a distance of 10 miles, some time before the coast is made out. The fort and the storehouse are more conspicuous than the tufted hillock about a quarter of a mile eastward of cape Juby.

The cape does not show out well, except from the north-east and south-west, and it might perhaps be preferable, especially in the early morning, when the sun is low, to make the coast a little to the south-west.

Tides.—It is high water, full and change, at the fort at about 0h. Spring tides rise about 10 feet.

COAST.—From cape Juby the coast turns to the south-west, forming little bays, off the points of which are some detached rocks, though the

general coast line is a sandy beach, with the exception of three small patches of cliff. At Tafaraout, 16 miles south-west of cape Juby, there are some remarkable black rocks on the sandy beach. At the distance of 4 or 5 miles inland there is a long range of broken sand-hills, not exceeding 250 feet above high water, named Los Matillos. In lat. $26^{\circ} 46'$ N. the sandy shore terminates, and a series of cliffs commences, extending south-west for 11 miles and then west for 30 miles, or to within 3 miles of False cape Bojador.

At 43 miles south-west of cape Juby there is a point with some little vegetation, and at 55 miles a slightly conical sand hill; these only interrupt the uniformity of this coast.

The mouth of Wadi Sakiet el Hamra is situated about 23 miles south of cape Juby; many of the streams on this coast are dry, except during the rainy season.

False cape Bojador.—This cape is low and sandy, with a reef of rocks extending from it about $1\frac{1}{2}$ miles to the northward.

Westward of False cape the coast forms a bight 16 miles across, the western point of which is fringed by rocks, and from which the coast trends in a direct line S.W. $\frac{5}{8}$ W., for a distance of 10 miles, to cape Bojador.

Landing.—Between November and March, landing on the coast can only be effected with difficulty on account of the heavy surf, but during the summer months and also when the land wind is strong, it is almost everywhere accessible.

See chart No. 1,229.

CHAPTER IV.

MADEIRA GROUP AND SALVAGE ISLANDS.

 VARIATION IN 1900.

Funchal - - 18° 40' W. | Salvage Islands - 18° 20' W.
 Decreasing about 4' annually.

MADEIRA ISLAND, the largest and most important of the group, is situated between the parallels of 32° 37' N. and 32° 52' N., and the meridians of 16° 39' W. and 17° 17' W. The island is 32 miles long in a north-westerly direction from San Lourenzo point to Pargo point; its extreme breadth from Cruz point on the south, to San Jorge point on the north, is nearly 13 miles, and the circuit of the island is about 80 miles. Funchal, its capital and seaport, is situated on the south side of the island.*

Pico Ruivo, the most elevated of the peaks which occupy the interior of the island, is 6,056 feet above high water, covered with vegetation, and has a well-defined but rather rounded summit; it stands on the north edge of the stupendous ravine of the Curral. With reference to the coast, it lies nearly 7½ miles in a north-north-east direction from Cruz point, and not quite 5 miles in an opposite direction from San Jorge point. The mountain has a continuous slope towards the sea, in a north and north-east direction; on the south-west side it drops abruptly into the Curral.

Boat harbours.—No part of Madeira affords a sheltered harbour and the word “ports,” attached to several places on the Admiralty chart, must be regarded as the designation given by the islanders to those little coves, or landing places, where they haul up their fishing boats, and those vessels of larger construction employed in the transfer of wine to Funchal, or on other coasting business of the island.

The anchorages on the north coast especially are only frequented by fishing boats, and, with winds from N.W. to N.E. by N., this coast is dangerous, and there is always a heavy sea.

Coast.—It may be stated generally that the south coast has a gradual slope from the mountains in the interior to the sea, and that the north and

* See Admiralty chart :—Island of Madeira, No. 1,831; scale, $m = 0.5$ inch.

west coasts, on the contrary, are, with few exceptions, high and bold, and descend precipitously.

FORA ISLET.—The first part of the coast of Madeira seen when approaching from the eastward is Fora islet, lying close to San Lourenzo point, the eastern extremity of the island. This islet, about 800 yards in length, in a north-east and south-west direction, and a little more than 200 yards in breadth, is surrounded by rocky cliffs except at its south-east side, where it slopes to the sea and offers the easiest landing; on the west side is a little rocky cove. The surface of the islet, of very uneven outline, is covered with a light stony soil and sand, and near the north extreme there is a peak, 352 feet above high water.

A rock, shaped like a sugar-loaf, marks the south extremity of Fora islet, and three or four low rocks lie close to its south-east shore, nearly midway between its extreme points.

Fora islet is separated from San Lourenzo point by a channel 200 yards in width, the depth in it at low water being from 3 to 4 fathoms, over rocky bottom; a swell or strong breeze with opposing tidal stream causes so great a turmoil in this channel that it is frequently unsafe for boats to pass through.

Fora islet is “steep-to” in all directions, except its south-east side, off which are dangerous rocky shoals surrounded by deep water. The outer danger, which lies nearly 4 cables south-east from the islet peak, is a small shoal with 4 fathoms water on it and 13 and 26 fathoms close to. The inner danger is more extensive, bearing from the peak S.E. by S., distant 3 cables, and upon this are several rocks, some with a depth of 15, others with only 4 feet water over them.

LIGHT.—On the east end of Fora islet an octagonal shaped lighthouse, 41 feet in height and painted white, attached to the keeper’s dwelling (also white), exhibits, at an elevation of 343 feet above high-water, a *fixed and flashing white* light, having a period of system of *half a minute*, which should be visible in clear weather from a distance of 25 miles.*

Storm signals.—Storm signals are shown from Fora islet, the signal station and semaphore being close westward of the lighthouse; the islet is connected by telegraph with the main island and vessels passing can communicate by the Commercial code.

CAUTION.—The distance of the shoals off Fora islet from the shore is so inconsiderable that sailing vessels would scarcely venture near them; but steam-vessels should be cautious not to round the islet too closely.

See chart No. 1,831.

* Period of system of flashing light reported to be 16 to 17 seconds. 1896.

COAST.—From Fora islet the extreme land seen to the south-westward is the low point of Oliveira, bearing W. by S., distant $10\frac{1}{2}$ miles; but the bold head of cape Garajao, or Brazen head, being much higher than Oliveira point, and bearing from it W. $\frac{1}{4}$ N. distant one mile, is seen over it.

Depths off shore.—The bank of soundings to the 100-fathoms line extends further off the land between San Jorge point and San Lourenço point than off any other part of the island, except Pargo point, and the depths over it are tolerably regular, except north-eastward of Porto da Cruz. North-eastward of San Jorge point the 100-fathoms line lies about $1\frac{1}{2}$ miles from the shore, and in the same direction from Porto da Cruz it extends for 3 miles. N.E. by N. from Castello point the 100-fathoms line is $2\frac{1}{2}$ miles from the shore, with a depth of 45 fathoms at a distance of one mile.

From Fora islet the bank of soundings, to the 100-fathoms line, extends for a distance of 3 miles in a north-east direction; the bank then curves to the southward to the Dezertas, narrowing to about 2 miles when midway. The quality of the bottom generally is dark gray sand and coral, while near the shore it is rocky.

On an E. by N. bearing from Fora islet, there is a depth of 30 fathoms close to the shore; at a distance of half a mile from the coast, 38 fathoms; at one mile, 50 fathoms; at 2 miles, 65; at 3 miles, 85; and at $3\frac{1}{2}$ miles, 150 fathoms.

On the parallel of Fora islet, at a quarter of a mile distant from the coast are 28 fathoms; at half a mile, 38; at one mile, 50; at 2 miles, 66; and at 3 miles, 80 fathoms water.

On the south side of Fora islet at a quarter of a mile distant from the shore there is a depth of 31 fathoms; at three-quarters of a mile, 60; and at one mile it deepens suddenly to 130 fathoms.

SAN LOURENÇO POINT, forming the eastern extreme of the island of Madeira is a narrow, irregular, rocky peninsula about a mile long. The land comprising the point is highest at the edge of the cliffs, on the northern side, and thence slopes to the southward. San Lourenço point is almost separated at high water from Furado point, which is a bold basaltic point with an archway worn through it.

Anchorage.—Steam-vessels can obtain temporary anchorage with good holding ground of sand, sheltered from N.W. and N.E. winds in a small bay immediately west of Furado point, here the landing is fairly good. On a hill, 377 feet above high water, and about half a mile west of this bay, there is a hermitage which, being painted white, with a red roof, is conspicuous.

Gaivolas point, lying N.W. $\frac{7}{8}$ W. distant $2\frac{1}{2}$ miles from Flora islet, is conspicuous from seaward, as close west of it is situated a hill, 380 feet above high water, on the summit of which there is a chapel with white walls and red roof.

Canical point lies W. by N. $\frac{1}{8}$ N., distant $1\frac{2}{3}$ miles from Gaivolas point, the coast between being lower than that to the eastward. From Canical point the land rises to the north entrance point of Machico bay, from which rocks extend a distance of about $1\frac{1}{4}$ cables.

Machico bay, a small bight surrounded by a beach of sand and small stones, is celebrated as the reported landing place of Robert Machim, the discoverer of Madeira. There is a fort on the north point of the bay, and another near the mouth of a mountain torrent which flows down the valley; the town is picturesquely situated on the shore. A rock, on which the sea breaks, lies S.S.E. $\frac{1}{2}$ E., distant 2 cables, from the north entrance point of Machico bay.

Queimada point, a rocky cliff with some flat rocks at its base, is the southern entrance point of Machico bay; from it Santa Katarina point (recognised by a steep rock 36 feet above high water, lying close to it) bears S.W. $\frac{3}{8}$ W. distant $1\frac{1}{4}$ miles.

The coast in the vicinity of Santa Katarina point is bold and has no detached dangers lying off it.

Santa Cruz.—Between Santa Katarina point and punta Guindaste, the next projection to the westward, is a bay on the northern shore of which is situated the village of Santa Cruz.

Porto Novo lies west of punta Guindaste in a small shingle bay where a considerable stream has its outlet.

Atalaya point, lying 9 cables south-west from punta Guindaste, has a curious small pointed peak on the cliff close to it. From this point the coast curves slightly inwards to Oliveira point.

Oliveira point, from which cape Garajao, or Brazen head, bears W. $\frac{1}{4}$ N. distant one mile, is a clean rocky point, "steep-to," upon which easy landing and ascent may be effected.

Cape Garajao, or Brazen head, a bold rocky headland, jutting out about 350 yards at right angles with the line of coast to the eastward of it, is faced by perpendicular reddish yellow cliffs, and above them is a narrow hilly ridge crowned by a rocky knob, 420 feet above high water, which particularly distinguishes the head when seen from the west ward.*

Westward of cape Garajao there is a small shingle beach.

See chart No. 1,831.

* See view on chart No. 1,831.

Depths off shore.—Cape Garajao is “steep-to,” there being 7 fathoms water within 20 feet of the cliffs; 38 fathoms a quarter of a mile off shore; at half a mile from the coast, 75 fathoms, and at 6 cables off there will be found a depth of 200 fathoms. The 100-fathoms line, between San Lourenzo point and this head, follows the general direction of the coast, at distances varying from 6 cables to one mile.

FUNCHAL BAY.—From cape Garajao, the eastern extreme of Funchal bay, Cruz point, its western limit, bears W. by N. $\frac{1}{2}$ N., distant 5 miles. The fort of Santiago lies 7 cables within this line of bearing, and midway between the points.*

Between cape Garajao and fort Santiago the coast is formed by a series of rocky cliffs and small stony points, westward of that fort a shingle beach extends 7 cables in front of Funchal, and terminates at fort San Lazaro. The shore then becomes rocky, and rises into a bold basaltic bluff opposite Loo rock, a little west of which the bluff turns abruptly inland and disappears, the shore sloping to the peninsula of the Pontinha.

Loo rock, the natural landmark for the anchorage in Funchal bay, is a steep rock, 70 feet above high water, rendered by art quite inaccessible except by steps built on the side opposite the land. The extreme length in an east and west direction of the rock is about 100 yards, and its breadth 35 yards.

LIGHT.—From an iron pole in the fort on north-east end of Loo rock, at an elevation of 112 feet above high water, a *fixed red* light is exhibited, which should be visible in clear weather from a distance of 8 miles, but the colour is reported not to be distinguishable until within 6 miles.

Storm signals.—There is a semaphore on the Loo rock and storm signals are shown; the latter being the same as those in use on the coast of France, with the addition that a cylinder, hoisted alone, indicates the probability of a gale, the direction of which is unknown.

Night signals.—Four lights, arranged in a square, denote that a gale is expected but its direction is unknown.

Three lights, arranged in a triangle with apex pointing upwards, that strong winds, or a gale from the northward, may be expected.

Three lights, arranged in a triangle with apex pointing downwards, that strong winds, or a gale from the southward, may be anticipated.

Funchal.—The city of Funchal extends along the shore of the bay from the fort of Santiago on the east to the ribeira de Sao João on the west, a distance of about three-quarters of a mile. The densely populated portions of it do not extend back perhaps more than a quarter of a mile;

* See Admiralty plan:—Funchal bay, with view, No. 1,689; scale, $m = 11$ inches.

but there are quintas (farmhouses) scattered over the numerous ridges behind the city. In 1890 the population was 36,982.

The view of Funchal from the anchorage is extremely beautiful. The most conspicuous objects on the west side of the bay are the Pico da Cruz, the Pontinha, Loo rock near it, and the old fortress of the Pico on a rocky eminence half a mile north of them; to the eastward of these the castle of San Lazaro, the official residence of the Governor, situated near the beach, and the outlet of ribeira de Sao João; Bangers pillar, built of dark stone and surmounted by a flagstaff, on the beach near the custom house; and on the extreme east the castle of Santiago, and the quintas upon the sloping land behind it.

The streets are illuminated with electric light, which is also used in the chief hotels, the theatre, and some private residences.

One of the most conspicuous objects seen when approaching Funchal bay is the church of Nostra Senhora do Monte, situated on a ridge 1,965 feet above high water, about 2 miles north of the city. A multitude of buildings, religious and domestic, with numerous mirantes, or high square turrets, all dazzling white, and covered with red tiles, fill up the intervening spaces, and reach far back up the rising grounds beyond the city, in the midst of gardens and vineyards.

There is a British Consul and Vice-Consul; the Consul's office is close to the westward of the landing place.

Communication.—Mail steam-packets between England and the Cape of Good Hope, and England and the West Coast settlements, call weekly at Madeira. Those between Lisbon and St. Paul de Loando touch at Funchal once a month, and there is also a monthly line of steam-vessels between Lisbon and Funchal. Telegraphic communication with all lines; there are two cables to Lisbon and St. Vincent. (*See Chapter I. page 28.*)

Coal and supplies.—About 5,000 tons of Welsh coal are usually kept in store on shore and afloat in a hulk; 800 tons is the average quantity which can be put on board in a day; about 400 tons are always available at once.

The coal hulk is moored S.E. by E. $\frac{3}{4}$ E., distant about 6 cables from Loo rock.

The coal lighters, provided with good fenders, carry from 50 to 130 tons each, in bags, and are towed by a tug; vessels can be coaled in almost any weather.

If intending to coal from the beach store, the anchorage recommended is in 12 fathoms water, over mud, with Loo rock lighthouse bearing West and the landing place N. by E. $\frac{1}{8}$ E.; from colliers, it will be found convenient to anchor a short distance to leeward of them, and the coal boats will drop down with their loads. Coaling from Pontinha

(whence vessels of war at all seasons generally obtain their supplies, and other vessels, where there is too much sea to coal from the beach during westerly winds), a suitable anchorage in 12 fathoms water is, with the west extreme of Loo rock bearing N.E. $\frac{1}{2}$ N. distant $1\frac{1}{2}$ cables.

Funchal is well supplied with fruits and vegetable and all necessary refreshments; and there is an ample supply of excellent water.

Coal signals.—A white flag with St. George's Cross is hoisted at the coal store, but only when coal can be taken from the shore. A flag hoisted over the bows of a vessel indicates that she requires coal; if hoisted, when entering the port, it signifies that coal is wanted alongside when at anchor. When a tug is required to move a lighter, Commercial letter T flag should be hoisted.

Repairs.—Small facilities for repairs to machinery at three machine shops; barges up to 200 tons have been built, and there is a derrick crane which will lift 10 tons.

Hospital.—There is a hospital for seamen, and a Sailors' Rest in connection with Miss Weston's, at Devonport.

Quarantine.—There are no special quarantine regulations; vessels may anchor, but must hold no communication with the shore before being boarded by the Health Officer.

Pontinha.—The Pontinha is an artificial embankment carried out in a southerly direction from the land to a small islet, from whence it is connected with Loo rock by a harbour mole, thus sheltering Pontinha bay from the southward, but the space for vessels is very small, and it is only allowed to be used by vessels which have suffered damage or require repairs.*

Landing.—A heavy surf commonly prevails along the whole of the beach in Funchal bay, and renders communication between vessels and the shore difficult. Landing is seldom attempted on the beach except in native boats; and through the experience and dexterity of the native boatmen, aided by the build and lightness of their craft, accidents but seldom happen.

On the eastern side of the Pontinha, is the most convenient landing place, there being, on the northern side of the islet, a flight of steps which lead to the street. The boats of vessels-of-war and mail steamers usually land at these steps, but it is rather an inconvenient distance from the city.

The pier, forming an extension of the *Entrada da Cidade*, has landing stairs on either side of it; here, in fine weather, it is stated that landing may be easily effected in ships boats. There are two electric lights at the landing place.

Trade.—See Chapter I., page 28.

See chart No. 1,689.

* *See plan of Pontinha bay on chart No. 1,689.*

Mountain streams.—Three streams, which have their source in the high lands near the centre of the island, discharge their waters into Funchal bay. Two of them, named Joao Gomez and Santa Luzia, have their outlets at a fort named Pelourinho, nearly midway between Santiago fort and the castle of San Lazaro. The third, Sao João, enters the bay between Pelourinho fort and fort San Lazaro. During summer these streams are generally inconsiderable, but the heavy rains which occur in winter have occasionally caused much damage to the city.

Depths off shore.—On the meridian of Loo rock, at the distance of a quarter of a mile from the shore, the depth is 25 fathoms, at half a mile 38, at three-quarters of a mile 58, at one mile 100, and at one mile and a quarter 200 fathoms.*

The soundings over Funchal bay are regular, and the quality of the bottom a fine dark sand, with some little mud.

Anchorage.—In the summer months, when land and sea breezes prevail, vessels may anchor anywhere in the bay (except in the prohibited ground) as most convenient; but the best anchorage, especially during the winter months, is south of Loo rock, with the centre of the citadel named Forte do Pico, seen midway between Loo rock and the end of Pontinha, bearing N. by E. $\frac{5}{8}$ E.

With the ruin on Pico de San Joao in line with the west extreme of Loo rock, bearing N. $\frac{7}{8}$ W., steam-vessels may anchor in from 12 to 18 fathoms water, and sailing vessels in depths of from 25 to 35 fathoms, over fine sandy bottom, the latter depth being found at about 4 cables from Loo rock. Should any vessels have previously taken up these positions, it is more advisable to anchor westward than eastward of them.

Vessels may also anchor anywhere along the bay on a line of bearing W. by N. $\frac{1}{2}$ N. from Loo rock in from 10 to 13 fathoms water.

Vessels are moored in Pontinha bay with their heads towards it by cables, either secured to the rock, by large ring bolts, or passed through holes cut, in the lower part of it, for that purpose, the stern fasts being secured to the opposite shore. The depth of water varies from 3 to 5 fathoms, over rocky bottom.

During winter small vessels frequently put to sea on the approach of a gale, but, in a westerly gale a full-powered steam-vessel may ride safely in a depth of 19 fathoms with Loo rock bearing W.N.W. distant 3 cables.

Merchant vessels are not allowed to anchor off Funchal between sunset and sunrise, but they may anchor on the quarantine ground west of Loo rock.

See chart No. 1,689.

* U.S.S. *Sartaoga* obtained soundings of 28 fathoms with Loo rock lighthouse, bearing N. $\frac{3}{8}$ W., distant nearly $5\frac{1}{2}$ cables. Commander C. F. Hutchins, U.S.N. 1897.

Prohibited anchorage—Telegraph cables.—The position of the shore ends (close eastward of fort Santiago) of the four telegraph cables laid in Funchal bay (two from Lisbon and two from St. Vincent) is marked by a black beacon, with two arms extended in the directions N. 50° E., and N. 45° W., indicating the angle within which the cables trend from the shore. Anchorage within the above limits is prohibited.

The tower of Nostra Senhora do Socorro, bearing eastward of N.E. $\frac{1}{2}$ E. clears the prohibited anchorage near the telegraph cables.

CAUTION.—During winter months every care should be taken to watch the indications of the weather, swell into the bay, drift of clouds, &c., and it will be advisable, if these indications are unfavourable, to quit the anchorage before real difficulties arise.

Steam-vessels, that are prepared to weigh at short notice, anchor off the city in less than 10 fathoms water; vessels of war are recommended by day to keep the west point of the bay open of the south part of Loo rock, bearing about West and the castle of San Lazaro to bear nothing westward of N. by W.; at night Loo rock light (*fixed red*) should not be brought to bear southward of West, nor should a vessel ever anchor in less than 9 fathoms at low water.

If detained in Funchal bay it is necessary to sight the anchor occasionally.

Directions.—During the summer months N.E. winds blow freshly up to cape Garajao, over San Lourenzo point, and continue on in that direction, leaving Funchal bay and a large space to the westward of it in calms, baffling, or light winds.

Should a sailing vessel reach cape Garajao, at this season, too late to take advantage of the land wind, and near the time when the sea breeze may be expected, cape Garajao should be given an offing of 2 or 3 miles, and the vessel kept to the westward in the stream of the N.E. wind, until Funchal bears about North; then haul in for it, and the calm region will soon be entered; shortly after, the sea breeze springing up will make a fair wind to the anchorage.

If a sailing vessel reaches cape Garajao when the sea breeze is nearly over, she may keep near the cape for the advantage of the coming land wind, and may often derive great assistance from her boats.

The land wind usually springs up earlier, and continues longer after rain; and the sea breeze sets in earlier and is more steady during fine dry weather; even a few partial showers sensibly affect this.

Approaching from the northward.—During the winter months, N.E. winds blow very strongly, accompanied by thick weather, when it is recommended to make Porto Santo to leeward, then the light on

on Fora islet (which bears from the south extreme of Baixo island S.W. by W. $\frac{1}{4}$ W., distant $21\frac{1}{2}$ miles), passing between it and Chao island, the north extreme of which bears from Fora islet S. by E. $\frac{3}{4}$ E., distant 10 miles. After getting under the land, should night come on, it is recommended, unless wishing to steam to the anchorage, to heave-to, with Loo rock light bearing about North.

Leaving Funchal.—The best time to leave Funchal under sail is with the first of the evening land breeze.

Tides.—It is high water, full and change, in Funchal bay at 0h. 48m.; springs rise 7 feet.

Tidal streams.—The tidal wave strikes these islands nearly at the same time as the Azores, the flood stream running to the north-eastward at the rate of $1\frac{1}{2}$ miles per hour at spring tides, and in the narrow channels between Dezerta islands and off San Lourenzo point, it sometimes attains the velocity of 2 miles per hour.

CRUZ POINT, the western entrance point of Funchal bay, is composed of high and perpendicular cliffs, at the south-west extremity of which there is a semi-detached pointed rock on which is a small iron cross. The coast from the Pontinha to this point is cliffy, "steep-to," and clear of danger beyond a short distance from the shore; and the 100-fathoms edge of the bank continues nearly parallel with it at the distance of about a mile.

Immediately westward of the Pontinha is situated a shoal bay, surrounded by a sandy beach at the foot of cliffs; in this bay are San João rocks, two small flat rocks a few feet above high water.

Ilheo do Gorgulho is a detached rock, shaped like a sugar loaf, lying 130 yards from the shore, two thirds of a mile east of Cruz point.

Praya Formosa is a small bay with a pebble beach, situated immediately west of Cruz point; at the western part of the bay there is a small rocky islet and three-quarters of a mile west of this the river Socorridos, which waters the Curral valley and is perhaps the largest river in the island, discharges into the sea.

Camara de Lobos, 2 miles north-west of Cruz point, has a town with about 6,000 inhabitants at its head, and a small fort on its western entrance point. Here there is an excellent harbour for fishing boats, a pier, and a road leading to Funchal.

Cape Girao, lying $3\frac{1}{3}$ miles north-west from Cruz point, rises in a remarkable sheer cliff to a height of 1,885 feet above high water; on the high land above this cliff, there is a grove of pine trees 2,079 feet above high water.

Lapa island, a conical rock, is about $1\frac{3}{4}$ miles north-west of cape Girao, and fronts the village of Campanario, and here terminate the beaches of

pebbles and rocks giving place to black pointed rocks; there is a great deal of cultivated land about this part of the island.

Ribeira Brava, about $1\frac{1}{3}$ miles west of Lapa island, is a rocky point fronted by three small black rocks; west of this there is a small sandy bay and the town of the same name; the river flowing down the Serra d'Agoa valley discharges here.

Sol point, $5\frac{1}{3}$ miles north-west of cape Girao, is a bluff rocky cliff; the town of Sol is situated in the ravine west of it.

COAST.—Between Sol and Galera points, a distance of $5\frac{1}{3}$ miles, the coast is formed of narrow rocky beaches, with small cliffs here and there intersected by the beds of mountain torrents; in some parts the land slopes gently to the sea.

At $1\frac{1}{4}$ miles from Sol point there is a remarkable, black pointed, basaltic rock, and three-quarters of a mile further north-west is the river and town of Magdalena.

Calheta.—Two and a half miles north-west of Magdalena is the town and river of Calheta; two or three white houses may be seen on the rocky shore, but the town, lying in a narrow ravine, is not open until abreast of it. A large building resembling a monastery, and conspicuous, stands on the rocks above the cliffs about a quarter of a mile west of Calheta. Galera point, three-quarters of a mile north-west of Calheta, is formed of flat rocks of black basalt, stretching out about half a cable from the coast.

Jardim point, the extremity of a landslip lying N.W. $\frac{1}{2}$ N., distant $6\frac{1}{2}$ miles from Sol point, may be recognised by the small village with a chapel situated on its summit.

Coast.—Paul do Mar is a village built at the eastern extremity of a landslip, which lies $1\frac{1}{4}$ miles north-west of Jardim point, and from it to Faja da Ovelha point, a distance of $1\frac{1}{2}$ miles, there is a beach of pebbles; here the land becomes higher, rising to the chain of western mountains.

PARGO POINT, the west extreme of Madeira, lies 20 miles north-west of Cruz point, the intermediate country being cultivated on all practicable spots, while, at $3\frac{1}{2}$ miles inland, the mountains are from 4,000 to 5,000 feet above high water.

The bluff of Pargo point is composed of bold rocky cliffs 930 feet high; and the smooth round-topped hill, which is half a mile eastward of it, is 1,380 feet above high water. A chapel is situated on the heights one mile eastward of Pargo point, 1,512 feet above high water, and, at an elevation of 1,623 feet, another chapel stands a quarter of a mile east of the cliffs of Faja da Ovelha point, $2\frac{3}{4}$ miles south of Pargo point.

Storm signals.—There is a storm signal station and semaphore on Pargo point.

Port Pargo.—At $1\frac{1}{4}$ miles south-east of Pargo point there is a fishing village and landing-place.

Depths off shore.—Some rocks and large stones lie scattered around the base of Pargo point, a few extend to the distance of 300 yards; and a ridge of rocky ground extends nearly $1\frac{1}{2}$ miles from the point to the north-west, on which, in strong westerly winds, there is a heavy sea. The soundings on it are very regular, from 11 to 19 fathoms, and a depth of 33 fathoms is found close to its outer extreme, while, at a distance of $2\frac{1}{4}$ miles from the shore, the bank drops to a depth of more than 100 fathoms.

South-west of the bluff of Pargo point the bank extends W. by S. for a distance of $4\frac{1}{2}$ miles, with from 40 to 50 fathoms water over it, the bottom being generally a light brown or dark gray sand, with occasional casts of rock; from these depths it increases very suddenly to 200 fathoms, whence to Funchal the bank follows the conformation of the shore at a distance of about $1\frac{1}{2}$ miles.

COAST.—**Tristao point**, the north extreme of the island of Madeira, is a high, bold, bluff, 1,070 feet above high water; it bears from Pargo point N.E. by E. $\frac{3}{4}$ E., distant 5 miles. The coast between is formed by an indented line of coarse stony beach, with high rocky cliffs rising abruptly from it.

Above the cliffs the land has a very steep ascent to the ridge of mountains 2 miles distant, some peaks of which exceed 4,000 feet in elevation. The cliffs are broken by several mountain torrents, water-falls, and deep ravines; and there are two extensive landslips, which are for the most part terraced and laid out in vineyards, and a few huts may be seen between the vines.

A church is situated on the heights, three quarters of a mile southward of Tristao point, at an elevation of 1,709 feet above high water.

Depths off shore.—The shore between Pargo point and Tristao point is clear, without any off-lying dangers, and midway between the points, at a quarter of a mile from the beach, there is a depth of 10 fathoms; at half a mile from the coast 22 to 25 fathoms, and at one mile 30 to 40 fathoms; outside the 50-fathoms line the bank deepens rapidly, and the 100-fathoms line is about $1\frac{1}{2}$ miles from the land. The general quality of the bottom is a fine dark sand.

Northward of Tristao point a few sunken rocks extend three-quarters of a cable from the coast, but at a distance of $1\frac{1}{4}$ cables north of it there is a

depth of 7 fathoms; at a quarter of a mile 8; at half a mile 27, and at one mile 42 fathoms, fine dark sand.

On the meridian of Tristao point the 100-fathoms line lies about 2 miles off shore, but after passing Rabacal rocks it turns to the south-east, approaching within 6 cables of Moniz island, and 9 cables of Seisal point. Off Delgada point in a north-west direction, the 100-fathoms line is about $1\frac{1}{4}$ miles from the shore, and $2\frac{1}{2}$ miles distant in a north-east direction.

NORTH-EAST COAST.—**Rabacal rocks**, on which the sea generally breaks, situated E. by N., distant 9 cables from Tristao point and half a mile off shore, is a cluster of flat rocks, a few feet above high water and “steep-to,” with no outlying dangers, and 17 fathoms water between them and the shore. No vessel should pass them in soundings.

Between Tristao and Moniz points the coast is formed of very high rocks, with, a pebble beach below, off which in places there are some small detached rocks. Moniz point, a mass of lava about $2\frac{1}{2}$ cables long in a north-east direction, has a singularly jagged outline; on its eastern part there is a small fort, with a cylindrical tower, standing on a little rocky hill near the shore.

The town of Moniz, where there is a church, stands on the highest part of point Moniz, and about a third of a mile south of the church, near a round tower, landing may be easily effected at a point having deep water close to.

Moniz island which lies E. by S. $\frac{3}{4}$ S. distant $1\frac{1}{2}$ miles from Tristao point, and $13\frac{1}{4}$ miles N.W. by W. $\frac{5}{8}$ W. from San Jorge point, is 236 feet above high water, situated 120 yards north-east of the point of the same name, and is of a yellowish colour with a black lava base, 300 yards in length from east to west, by 100 yards in breadth; it is “steep-to,” and the passage between it and the point is full of rocks.

Coast.—Between Moniz island and San Jorge point the coast forms a bay, which at San Vicente, midway, is $2\frac{3}{4}$ miles within the line of the outer points; here is an extensive valley and large stream. The coast of the bay is principally rocky, the most prominent features being Seisal and Delgada points.

At the western part of this bay, lying near the shore and bearing S.S.E., distant one mile, from Moniz island, are situated Janella rocks, five in number, the outer and largest being about 130 feet above high water, and of a yellowish colour with a black lava base.

Seisal point, a comparatively low cliff, lies 4 miles south-south-east from Moniz island; it is “steep-to” and has a landing-place on its eastern side over a rock connected with the coast by a bridge. The town of Seisal stands on the highest part of the point.

San Vicente river, 3 miles south-east of Seisal point, forms a small bay at its mouth, in which there is a detached rock in the form of a sugar loaf, which has been hollowed out and converted into a hermitage. Galiana rock is 2 miles east of this and between are several rocks near the shore, on which the sea breaks.

Delgada point, lying S.E. by E. distant $9\frac{1}{2}$ miles from Moniz island, is comparatively low, projects 3 cables, and is composed of rocky cliffs; rocks and boulders extend from it under water for a distance of $1\frac{1}{2}$ cables, there is generally a swell, and at times tremendous rollers and heavy breakers on them. There is a town on the summit of the point situated near the cliffs, from which the land rises to the interior of the island, and shows a considerable extent of cultivated country.

Landing place.—Close to Delgada point on its eastern side is a small bay and shingle beach, which offers the best landing in the vicinity.

Coast.—About a mile east of Delgada point there are some groups of rocks; Boa Ventura of a dark red colour, and Bacha rock of black lava being the largest; the river Entroza enters the sea here and is marked by two white houses. Arco peak, $1\frac{1}{4}$ miles south-east of this, is a very remarkable sharp peak, covered with vegetation, and 2,746 feet above high water.

SAN JORGE POINT, the north-east extreme of Madeira, $4\frac{1}{3}$ miles E. by S., from Delgada point, is a high, bold, rocky bluff nearly 700 feet above high water. The perpendicular cliffs which face it are of a dirty red colour and afford landing in fine weather, though there are no means of ascent.

At a distance of 3 cables, S.E. by E., from San Jorge point, there is a small rock just visible at low water, and "steep-to" all round; south-east of this in the bay formed by San Jorge and St. Anna points, the river San Jorge discharges, its western bank being marked by some houses and a small fort, and at 3 cables east of this is San Jorge islet, 131 feet above high water.

Coast.—The coast between San Jorge point and Castello point forms a bight 2 miles in depth, at the head of which nearly midway, is situated Porto da Cruz, a small bay with rocky shores and points and a small town at its head; eastward of that the coast is formed by bold rocky cliffs of great elevation as far as the meridian of Canical; thence the cliffs rise from the sea with equal abruptness, but are of less height, and continue to decrease in elevation as they advance eastward to Castello point, having many off-lying rocks and islets at their base.

St Anna point, about $1\frac{1}{4}$ miles south-east of San Jorge point, has some rocks extending a short distance off it, and here a great deal of the higher

See chart No. 1,831.

land is under cultivation and there are many country houses. From St. Anna point the coast, without any deep indentations, and few off-lying rocks and islets, trends S.E. by S. for 2 miles to Cortada point, which is high, black and narrow, ends in a very pointed extremity above the cliff, and forms the north extreme of that bight.

Tide rock, awash at low water, and "steep to" is situated about $1\frac{1}{4}$ miles south-east of St. Anna point and 2 cables from the shore.

North-west of Cortada point, distant about two-thirds of a mile, there is a sharp peak of a singular form, 1,732 feet above high water, named Navio rock: it rises, above a great mass of rock at its base, at the edge of the cliff.

South of Cortada point there is a bight, about 4 cables deep, the south extreme of which is Fayal point; the point is comparatively low and narrow, with perpendicular cliffs at its extremity; to the eastward, at a distance of 3 cables, is situated the black islet of Fayal, shaped like a sugar loaf, 72 feet above high water, and "steep-to."

The outlet of the river Fayal is in the centre of a stony beach about a quarter of a mile south-east of Fayal point, and the town of the same name is situated on a height a short distance from it.

Ilheo da Cruz.—Rocks and islets extend from the shore in the vicinity of Porto da Cruz for a considerable distance. Ilheo da Cruz, the largest and highest of these, lies $1\frac{1}{2}$ cables north-east of the northern entrance point of that bay.

Porto da Cruz.—Anchorage.—In February 1885 the Channel Squadron anchored off this port, the westerly wind and sea making it dangerous to remain in Funchal bay; shelter was found with good holding ground, though the squalls from the westward blew off the land with great violence. H.M.S. *Achilles* anchored in 34 fathoms, with Ilheo da Cruz bearing W. $\frac{3}{4}$ N.; S. Antonio point S. $\frac{1}{4}$ W.; Brancas island S.E. $\frac{3}{4}$ E.

The landing place for boats is just westward of the town, where the rocks form a natural cove.

Coast.—From S. Antonio point to Castello point the coast is inaccessible, being for $2\frac{1}{2}$ miles formed of high cliffs, further eastward these are less elevated, and no beaches of any length are seen between the points, nor are there any rocks at more than $2\frac{1}{3}$ cables distant from the shore.

Castanho peak, three-quarters of a mile inland, and about 4 miles south-east of Porto da Cruz, is a green wooded peak, 2,058 feet above high water, and the eastern mountain of Madeira; the land eastward of it has a steep descent to the town of Canical.

Castello point bears N.W. $\frac{3}{4}$ N., distant $2\frac{1}{4}$ miles from the east extreme of Fora islet, the intermediate coast being "steep-to," the point

See chart No. 1,831.

is formed of reddish cliffs, high, bold, perpendicular, and 534 feet above high water, the highest part of the land in the vicinity being 614 feet high; a rock, which breaks, lies close to Castello point.

Brancas island, lying rather more than a cable north-west of Castello point, is a tall sugar-loaf rock, with an archway through it; its summit is of a white colour, and inaccessible.

Between Brancas island and San Lourenzo point there are many rocky points, one of which, named Agostinho, almost forms an islet at high water.

DEZERTA ISLANDS are three rocky islands lying off the south-eastern extreme of Madeira, from which their northern extremity bears S. by E $\frac{3}{4}$ E., distant 10 miles. The northern island of the group is named Chao, the centre Dezerta Grande, and the southern Bugio; their general direction, from Sail rock to the south point of Bugio island, is South, for a distance of $12\frac{1}{2}$ miles.*

The Dezertas have no permanent inhabitants, but are occasionally visited from Madeira by fishermen and herdsmen, also by those in search of orchilla (sea weed).

Sail rock.—Half a cable north of the bold bluff which forms the north extreme of the group is situated a remarkable rock, commonly known as the Sail rock; it is a mere column, 160 feet above high water.

Depths off shore.—From the east extreme of Madeira, a bank of soundings, about 2 miles wide within the 100-fathoms line at its narrowest part, extends across to Chao island. The depths along the middle of the bank, until within one mile of Sail rock, are from 45 to 72 fathoms, and in moderate weather fishing boats frequently anchor there.

This bank continues entirely around the Dezertas, on the east side the 100-fathoms line being $1\frac{1}{2}$ miles distant from the shore, on the west side 2 miles, and on the south side $1\frac{1}{2}$ miles. The depths on this bank are tolerably even, except off the north extreme of Chao island, where the soundings are irregular, and under 15 fathoms for a distance of one mile off shore. The bottom is diversified with fine sand of various colours, coral, shells, and rocks.

Chao island, bare, table-topped, and surrounded by high rocky cliffs, is nine-tenths of a mile in length, and one-quarter of a mile in breadth at its north extremity, which is a high, bold bluff, 325 feet above high water, and off which rocks extend for a distance of 2 cables; at the south extreme it terminates in a very narrow point, from which rocks extend S. by E. for a distance of one cable, leaving only a boat passage between them and the north extreme of Dezerta Grande.

See chart No. 1,831.

* *See view on chart No. 1,831.*

Landing.—On the west side of the island, one-third of its length from the south extreme, is situated a cove, which affords the best landing.

Dezerta Grande island.—This is the largest and most elevated of the Dezerta group; its shores are generally steep and rocky, and high bold cliffs of rock characterise the greater part of them. The island is $6\frac{1}{3}$ miles in length, by one in breadth at Pedregal point, which is its widest part. From the high land in the interior of the island south-east of Pedregal point, there is a continuous rocky chain of heights to the south extreme, the most elevated peak being a rocky hill 1,600 feet above high water. Northward of these high lands, there is a double ridge of hills, with an extensive valley between them.

Fresh water.—At the head of the valley, near the centre of the island, there are ponds, and a spring yielding a small quantity of pure water.

West coast.—The western coast of Dezerta Grande island consists of high broken cliffs, with here and there a large fragment fallen at their base.

Landing.—On the west side of the island, $1\frac{1}{3}$ miles from the north extreme and two-thirds of a mile north of Pedregal point, is situated port Castanheira, a small cove that affords landing.

East coast.—The general character of the east coast of the island is that of a rugged, broken, irregular line of cliffs, having in many cases slopes from them to the stony points, which originate in occasional landslips from these cliffs.

Bugio channel.—From Boquerao point, the south extreme of Dezerta Grande island, the north point of Bugio island bears S. by W. $\frac{1}{2}$ W. distant 7 cables. Both points are clear, having 7 fathoms water within 30 yards of them, and the channel between them is free from danger, the depth in it being from 19 to 20 fathoms.

Bugio island is 4 miles in length in a north and south direction. The coast on the east side between the extreme points forms a bight half a mile in depth. Both shores are formed by rocky cliffs of less altitude than those of Dezerta Grande, surmounted by a very sharp serrated rocky ridge of hills, which extends the whole length of the island.

Near the centre of Bugio island there is a gap, which seen from a distance gives it the appearance of two islands. The breadth of the island at the gap is 200 yards; its greatest breadth does not exceed half a mile. The highest peak on the northern part of Bugio island is 1,300 feet high, that on the southern part is 1,070 feet above high water.

See view on chart No. 1,831.

CAUTION.—There is much danger to sailing vessels passing close under the lee of these islands with strong breezes, from the violence of the gusts, which are most variable, both in direction and strength.

Tidal streams.—The tidal streams set by the Dezerta islands during spring tides, at the rate of $1\frac{1}{2}$ to 2 miles per hour ; the flood in the direction of N.E. by E., and the ebb S.W. by W. Springs rise 7 feet.

PORTO SANTO ISLAND.—This island, containing about 4,000 inhabitants, is a dependency of Madeira, and its government is administered under authority from that island. It is $6\frac{1}{2}$ miles in length in a north-east and south-west direction, the mean breadth being $2\frac{1}{2}$ miles, and it is about 17 miles in circuit. Porto Santo stands on an extensive bank of soundings, and its salient points are distinguished by small islands and islets lying off them.

The north-eastern portion of the island consists of numerous rocky sharp mountains, some of them nearly 1,700 feet above high water, with bold cliffs facing the sea, and all its northern coast is characterised by high rocky cliffs, generally inaccessible, with rocks, some above and others under water, lying along their bases.

The central portion, though considerably less elevated than the extremities, is high near the cliffs of the north and north-west coast, where in some places it is 700 feet above high water. From thence it slopes to the southward, and terminates in a white sandy beach, which forms the entire south-eastern shore. On the central portion of the island are several sandy plains covered with what appears to be fossil heath stems, but it would seem probable that they are coral formations.

The south-west extreme of the island is rocky and elevated, some of the hills exceeding 900 feet in height, and one peak, named Anna Ferreira, is distinguished by the columnar structure of its summit.

Porto Santo bay.—This bay, on the south-east side of the island, having Baixo island for its western and Cima island for its eastern limit, affords fair shelter in settled weather.*

Villa Baleira or Porto Santo, the capital of the island, is situated near the centre of the bay ; the church and court house are conspicuous, and close west of them there is a small fort. The population is about 1,800.

Supplies.—On the comparatively low part of the island between its north-east and south-west extremities, wine is produced, and most varieties of grain, vegetables, oranges and fruits, but the island is remarkably destitute of trees and water ; live stock and poultry are plentiful.

See chart No. 1,831.

* *See Admiralty plan :—Porto Santo bay, No. 1,688 ; scale, m = 3 inches.*

The island of Porto Santo is of more use to the mariner as a landmark than for supplies, since whatever it can afford is more readily obtained at Madeira.

Landing.—The landing at Porto Santo bay is usually effected upon the beach in front of the town.

Anchorage.—A convenient berth is 6 cables off shore, in 12 fathoms water, with Pico do Castello bearing N. $\frac{1}{4}$ W., and the south extreme of Cima island E. by S. $\frac{1}{4}$ S. A large vessel should anchor in a depth of 17 fathoms, with the south extreme of Cima island bearing E. $\frac{1}{4}$ S. Within the depth of 15 fathoms the bottom in the eastern part of the bay is either sand, or sand and shells; outside that depth it is coarse sand or coral.

Care is necessary in anchoring, as the 100-fathoms line is about half a mile southward of the latter berth.

CAUTION.—During the fine weather, which usually accompanies the summer months, vessels anchor nearer the shore, but care should be taken to avoid being caught in the bay when the weather is not settled, for southerly winds of any strength throw a high sea into it.

Tides.—It is high water, full and change, in Porto Santo bay at Oh. 50m.; springs rise 7 feet.

Ponta do Incaõ or Incaõ point, the south-east extreme of Porto Santo, is formed by cliffs terminating in a low rocky point, off which lie several rocks.

Cima island is bare, 361 feet above high water, two-thirds of a mile long, in a north-west and south-east direction, and 2 cables broad; it is "steep-to" except at its north-west extreme, where a boat passage of 2 cables in width, exists between it and ponta do Incaõ. On the north-east side there is a cove where, in good weather, landing may be effected.

LIGHT.—*Intended.*—The light, which will probably be exhibited early in 1900, will be 387 feet above high water, and visible from a distance of 18 miles, but at first will be of a temporary character.

Ponta dos Frades or Frades point, lying N.N.E. $\frac{1}{2}$ E., distant one mile nearly from ponta do Incaõ, is bold and steep; the light between ponta dos Frades and Cima island is known as Porto dos Frades.

Penedo Redondo, a rock a few feet above water, lies S.S.E. $\frac{1}{4}$ E. distant $1\frac{1}{2}$ cables, from ponta dos Frades.

Branco point.—The north-east extreme of Porto Santo is composed of three bluffs, the northern being a bold promontory 1,390 feet above high water, off which lie three rocky islets with navigable channels between them. At one mile south of the southern bluff there is a sandy beach and stream at the head of a bight.

Pescador islet, the inner of the islets lying off Branco point, bears from that point E. by N., distant 3 cables; it is composed of rocky cliffs, 358 feet above high water, covered with trees.

See charts Nos. 1,688 and 1,831.

Lourenzo rock, the middle islet, is a cluster of rocks, 38 feet above high water, with a few trees upon them, bearing from the summit of Pescador islet N.N.E. $\frac{1}{2}$ E., distant 6 cables.

North-east rock, the outer islet, lies 6 cables N.N.E. from Lourenzo rock; it is of nearly the same size as Pescador islet, and also consists of steep, rocky, irregular cliffs; it is thickly wooded, and near the centre there is a peak 330 feet above high water.

San Cruz point, lying N.W. $\frac{1}{3}$ W., distant $1\frac{1}{2}$ miles from Branco point, is a sharp point, with a rock, a few feet above high water, lying one cable north of it; between San Cruz and Branco points the coast forms two bights.

Fonte island, small, black, and of basaltic structure, is 270 feet above high water; it lies N.W. by N., distant one mile, from Fonte point on the north shore of Porto Santo, and is "steep-to"; there is a depth of 16 fathoms between it and the shore.

Coast.—The north coast of Porto Santo is cliffy, and trends W. by S. from San Cruz point for a distance of 3 miles in nearly a direct line; at this distance the coast trends more southerly and is more indented for a distance of 3 miles to Furado point.

Furado point is a double point, both projections of which are considerably lower than the adjacent cliffs, which are nearly 900 feet above high water, and gradually decrease in height to the southward, terminating at Calheta point, the west extreme of Porto Santo bay.

Ferro island, lying off the west point of Porto Santo, is of triangular form, each side being about half a mile in length. The coast consists of rugged and almost inaccessible rocky cliffs, above which is a scanty soil covered with coarse grass. The most elevated land lies near its north coast, and is 380 feet above high water. A ledge of rocks extends towards the shore of Porto Santo, leaving a channel about $1\frac{1}{2}$ cables wide between. The island is "steep-to" on its west-side, and the 100-fathoms line is about 7 cables from the shore.

Baixo island lies $2\frac{1}{4}$ cables off the south-west extreme of Porto Santo, with a channel between which is safe for boats in moderate weather. The island is $1\frac{1}{2}$ miles in length from north to south, and its greatest breadth is three-quarters of a mile. It is surrounded by high rocky cliffs, "steep-to" except at the north extreme.

Viewed from the east or west, Baixo island presents a somewhat table-shaped summit, having a hummock, near its north extreme, that is 570 feet above high water.

Limestone.—On the west side of the island, close southward of the rocky head which forms the north extreme, there is a cove from whence

* See charts Nos. 1,688 and 1,831.

quantities of limestone, with which the island abounds, is shipped by the boatmen of Madeira. The presence of limestone on so small an islet is remarkable, the more especially as it is not found either on Ponto Santo, the Dezertas, or Madeira, a small spot in the valley of San Vicente on the latter island excepted. It is quarried from veins forming galleries, entered at the sides of the cliffs.

Depths off shore.—The 100-fathoms line lies 6 cables from the south extreme of Baixo island, and the same distance from the west portion of Porto Santo bay, whence it continues in an easterly direction to Cima island, off which it lies in a S.S.E. direction at a distance of $2\frac{1}{2}$ miles, forming a narrow fishing bank. From Cima island to N.E. rock the 100-fathoms line is generally about a mile from the shore, and it lies about 2 miles north of that rock.

The least water found on this portion of the bank, which breaks occasionally, was 10 fathoms, at a distance of $1\frac{1}{3}$ miles north of N.E. rock. From the north-west coast of Porto Santo, the bank of soundings to the 100-fathoms line extends off 8 miles, the general depths on it are from 25 to 35 fathoms, the bottom consisting of fine white sand, rock, coral, shells and gravel.

Falcon rock.—Near the north-east margin of the bank which extends north-west from Porto Santo is situated Falcon rock, on which there is a depth of $4\frac{1}{2}$ fathoms at low water. It stands on a rocky shoal 3 cables long by 2 cables broad, on which are depths of 11, 15, and 17 fathoms, and the sea is reported to break heavily upon it in stormy weather.

From Falcon rock N.E. rock bears S.E. $\frac{1}{4}$ S., distant $6\frac{1}{4}$ miles; Fonte island S. $\frac{1}{2}$ W. $4\frac{1}{2}$ miles, and Ferro island S.S.W. $\frac{1}{8}$ W., distant $8\frac{1}{4}$ miles. On the east side of Falcon rock the 100-fathoms line is half a mile distant.

Clearing marks.—If wishing to pass east of Falcon rock, when at a distance of 10 or 12 miles from Porto Santo, the eastern high land of that island should be brought to bear South, which leads 3 miles east of the rock. The western high land of Porto Santo bearing S. $\frac{1}{4}$ E. leads the same distance west of this danger.

Vessels approaching from the north-eastward with a fair wind, may pass between Falcon rock and Porto Santo, by keeping Fonte island in line with the high south-west part of Porto Santo, bearing S.W. by S., until soundings can be struck, remembering that Branco point, open of San Cruz point, bearing S.E. $\frac{1}{2}$ S., leads $1\frac{1}{3}$ miles south-west of Falcon rock.

Styx bank, situated 9 cables, N. by W. $\frac{3}{4}$ W., from Falcon rock, is another rocky bank of comparatively shoal water, named after the vessel in which it was examined. The least water found upon it was 12 fathoms,

* See charts Nos. 1,688 and 1,831.

with casts of 17 and 20 fathoms near it; at 3 cables east of it the depth was 100 fathoms. Northward of Styx bank the soundings to the 100-fathoms line extend one mile, and westward of it they extend $2\frac{1}{4}$ miles; the bank then extends southward toward Ferro island at the west extreme of Porto Santo.

SALVAGE ISLANDS, lying S. $\frac{3}{4}$ W., distant 140 miles from Bugio island (Dezertas), and N.N.E. $\frac{1}{4}$ E. distant 90 miles from the north-east point of Tenerife, the nearest of the Canary islands, are two groups of rocky islands, distant from each other 8 miles in an E.N.E. and W.S.W. direction, with a clear passage between them.*

Great Salvage, the name by which the north-eastern group is known, consists of one large island, of irregular form, about 3 miles in circuit, 455 feet above high water, apparently bare, and visible from a distance of 25 miles; when seen from either the northward or southward, it appears as two peaks, Burt peak, the western, being the higher; several small islets and rocks lie scattered around it.

Anchorage.—H.M.S. *Prometheus* in 1813 anchored on the south side of Great Salvage island in 12 fathoms water, over clear ground, with the following bearings: east extreme of the island E. by N. $\frac{1}{4}$ N.; west extreme N.W. $\frac{3}{4}$ N., and a breaking rock N.W. by W. $\frac{1}{2}$ W.

In 1866 H.M.S. *Dart* anchored in the bay on the east side of Great Salvage island, in a depth of 13 fathoms, over coarse grey sand, and sheltered from westerly winds, with the entrance points of the bay bearing North and S.S.W.

CAUTION.—When seeking an anchorage, Great Salvage island should not be approached within 2 miles, except when bearing between N.N.E. to N.W. by N., as rocks above and below water extend to a distance of about one mile in all other directions.

Landing.—Good landing may be obtained in the centre of the bay on the east side of Great Salvage island.

Alkali, from the ashes of which barilla is procured, grows on this island.

Directions.—If wishing to anchor, make the island on a N.W. bearing and anchor in the bay on the east side; probably the anchorage on the south side would be safer in summer if the trade wind blows strongly.

THE PITONS, or south-western group of Salvage islands, consists of two islands, named Great and Little Piton; they are connected by rocks, some covered and others above water, and landing on them at any time would be attended with great danger.

* See chart No. 1,831.

* See Admiralty plan:—Salvage islands, with view, No. 365; scales, $m = 3.2$ and 0.8 inches.

Great Piton island is $2\frac{3}{4}$ miles long in a N.E. by E. and S.W. by W. direction. Hart hill, a steep peak, near its centre, 140 feet above high water, when seen from a distance, has the appearance of a sail. The island appears green on its south side, the north side being barren; it may be seen, in clear weather, from a distance of 15 miles.*

On the north-east and south-west extremes of the island are some hummocks, which from a distance appear as islets.

Little Piton island, situated one mile W.N.W. from Great Piton island, and lying parallel to it, is flat, about three-quarters of a mile long, and has rocks extending $1\frac{3}{4}$ miles westward of it.

Lecky reef, 10 feet above high water, and surrounded by rocks, lies N.E., distant 9 cables from the north extreme of Little Piton island.

Directions.—Sailing vessels bound from Madeira to Tenerife during winter months, when westerly and south-westerly winds prevail, are sometimes unable to weather the Salvage islands, but they should not approach them within 3 miles on the east side. Care is also necessary, when in their vicinity at night time, not to be drawn too close to Piton islands; westward of them a vessel should not approach within 4 miles.

CAUTION.—It should be borne in mind that a direct course from Funchal to Anaga point (Tenerife) passes only 13 miles westward of Piton islands.

DACIA BANK, in latitude $31^{\circ} 10' N.$, longitude $13^{\circ} 34' 45'' W.$, was closely examined, in 1894, by H.M. surveying ship *Waterwitch*, which vessel spent over four and a half days on the bank. The least depth obtained was 47 fathoms in the position above given, and there were no indications of shallow water; the bank has a gradual slope to the westward, and, throughout, the nature of the bottom was coralline sand and broken shells. During the examination there was a slight set to the N.N.W. over the bank.

Dacia bank lies in the track of vessels bound from Lisbon or the strait of Gibraltar to the Canary islands.

* See view on chart No. 365.

CHAPTER V.

CANARY ISLANDS.

 VARIATION IN 1900.

Tenerife - - - 18° 10' W.

Decreasing about 3' annually.

CANARY ISLANDS.—The group is separated from the African continent by a clear channel nearly 54 miles wide, between the south-east extreme of Fuerteventura island and cape Juby. The land of the Canary islands is generally high, being composed of volcanic mountains, so lofty that during a great portion of the year the summits of most are covered with snow. (For further description, *see* Chapter I., page 29.*)

General directions.—All the channels between the Canary islands are clear and safe, but if passing through the group without wishing to stop, that between Palma and Hierro on one side and Gomera and Tenerife on the other is recommended, as the belt of calms to leeward of the latter islands is not so extensive as that found in the other channels.

A belt of calms generally extends 30 miles to leeward of Palma, 15 miles to leeward of Tenerife, and 25 miles to leeward of Gran Canaria islands; the sea in these calm regions is frequently rough and irregular, and heavy squalls are experienced, which give little warning.

When approaching the Canary islands from the southward with a foul wind, it is not advisable to attempt to beat through the channels, but a vessel should pass westward of the group.

PALMA ISLAND, the north-western of the group, is 25 miles long in a north and south direction, 13 miles broad at its north part, and narrow and pointed at its southern extreme; whence to within one mile of its northern extremity a series of volcanic mountains extend, terminating in three lofty peaks, the highest being Pico de la Cruz, 7,730 feet above high water. The population of the island is estimated at 40,000.†

* *See* Admiralty chart :—Cape Ghir to Garnet head, including the Canary islands, No. 1,229; scale, $m = 0.07$ inch.

† *See* Admiralty chart :—Palma, Gomera, and Ferro islands, No. 1,873; scale, $m = 0.5$ inch.

Coast.—The shores of Palma island are generally safe to approach within a moderate distance, as the few rocks, which lie off the points, are in most cases near the coast; the northern and north-western coast is formed by cliffs, which, at Gorda point (the north-west extreme of the island), attain an elevation of 1,100 feet above high water; the east and south-west coast is formed by alternate bluffs and beaches.

Communication.—There is telegraphic communication with Cadiz and St. Louis, *viâ* Tenerife.

Fuencaliente point, the southern extremity of the island, is rocky and steep, the 100-fathoms line being only 3 cables off shore; from it Teno point, the western extreme of Tenerife, bears S.E. by E. $\frac{5}{8}$ E., distant 48 miles; Peligro point, the north-west extreme of Gomera island S.E. $\frac{1}{4}$ S., 30 miles; and the north extreme of Ferro island S.S.W. $\frac{3}{8}$ W., 36 miles.

A remarkable hill, 780 feet above high water, named mount Viento, is situated near the coast about $1\frac{1}{2}$ miles north-east of Fuencaliente point.

LIGHT.—**Fuencaliente point.**—*Projected.*

SANTA CRUZ.—On the east side, about midway between the southern and north-east extremities of Palma island, is situated the chief port of the island. There is a mole which it is intended to prolong to the southward, to facilitate the loading of vessels and boats. It affords a limited but secure anchorage, close off the town, in 15 or 20 fathoms water. The town, built on a sandy beach at the middle of the bay, has a population of 6,695, and is well supplied with water; fresh provisions are abundant.*

Three rocky islets lying near the beach, south of the town of Santa Cruz, are easily recognised by their dark colour.

LIGHT.—A *fixed red* harbour light is exhibited on the mole at Santa Cruz, from a pole 19 feet in height, on a movable carriage, at an elevation of 28 feet above high water. The light, which may be shifted in position according to the state of the sea, should be visible, in clear weather, from a distance of 4 miles.

Cumplida point.—The north-eastern extreme of the island is clear; at three-quarters of a mile northward of the point the depth is 35 fathoms, increasing rapidly to 100 fathoms.

Five high hills rise above Cumplida point; these are conspicuous when bearing S.S.W.

LIGHT.—The lighthouse on Cumplida point is a conical building 112 feet in height, of a dark gray colour, with a white lantern, and

* See plan of Santa Cruz on Admiralty chart No. 1,873; scale, $m = 4.4$ inches.

exhibits, at an elevation of 207 feet above high water, a *revolving white* light with a period of revolution of *one minute*, illuminating an arc of 239° between point Gaviota and point Barlovento, and should be seen, in clear weather, from a distance of 21 miles.

Muda point, the north extreme of the island, is surmounted by an isolated hill, 1,000 feet above high water ; the most off-lying dangers in the bight between Cumplida and Muda points are Topaciagos rocks, below water, situated two-thirds of a mile west of Gaviota point (the first projection west of Cumplida point) and Manga rock, a small islet in the bight east of Muda point.

San Domingo rock, 120 feet above high water, lies 100 yards off a point of the same name, about midway between Muda and Gorda points ; in the small bight eastward of this rock there are two others not quite so high.

Tazacorte anchorage.—On the west side of the island, about 13 miles north of Fuencaliente point, anchorage may be obtained, in 17 fathoms water, about half a mile from the shore, north-west of the large village of Tazacorte, it is however completely open to westerly winds.

Juan Graie point, the northern limit of this anchorage, is 780 feet above high water, with a sunken rock, on which the sea breaks, lying about a cable S.S.W. from it ; and at the southern part of this anchorage, half a mile S.S.W. from the village of Tazacorte, and about a cable from the shore are situated Gabasera rocks, two of which are above water.

Tazacorte, being situated on the southern side of a deep ravine with two high hills rising immediately north-east of the village, is easily recognised from seaward.

Depths off shore.—The island is surrounded by deep water, the 100-fathoms line being generally about one mile from the shore.

Tides.—It is high water, full and change, at Palma island at 0h. 30m. ; springs rise 9 feet (approximate).

GOMERA ISLAND, lying 15 miles west of Tenerife, is of almost circular form, about 12 miles in diameter, and surrounded by rugged perpendicular cliffs, with a few sandy beaches and detached rocks ; near the coast the mountains are about 2,000 feet above high water, whilst, near the centre of the island, Alta Garaoné attains the elevation of 4,400 feet.

Population.—The population of Gomera island is estimated at 14,140.

Bermeja rock, with less than 6 feet water on it, lies 2 cables off shore, one mile northward of San Cristoval point ; this is the only rock, round the coast of Gomera island, not visible at all times.

LIGHT.—**San Cristoval point.**—*Projected.*

See chart No. 1,873.

Anchorage may be obtained off Gomera island at the following places:—On the north-east side of the island, westward of Mahona point, in 11 fathoms water, over sand; south-east of Organo point, the north extreme of the island, in depths of from 9 to $11\frac{1}{2}$ fathoms, over sand; in the west extreme of the island, in Playa de los Ingles, a bight immediately north of Calera point; in the bight lying south-east of Trigo point, a foul point $1\frac{1}{4}$ miles south-east of Calera point; on the south coast of the island, in 9 fathoms water off Erece bay, a mile east of Becerro point, and in Playa de Santiago, $2\frac{1}{2}$ miles eastward of Erece bay.

The western anchorages are good for temporary purposes during the summer, and the eastern in winter.

Port Gomera.—In this small bay on the south-east side of the island, one mile west of San Cristoval point, is San Sebastian, the principal town; here vessels anchor in 10 or 15 fathoms water, over sand and coral, and from the shelter afforded it is said to be a good place for effecting repairs; landing can be effected in all winds at the north-east corner, or in port Hilo, a small bight north of port Gomera, connected with it by a canal which is closed at night. San Sebastian has a population of 2,861.

In 1897 H.M.S. *Active* anchored off San Sebastian, in 22 fathoms water, and found it a good anchorage, except for the squalls which come off the land.

Commodore G. L. Atkinson, H.M.S. *Active*, remarks: “With a N.E. wind the point gives good shelter, and it is a sheltered anchorage with a westerly wind.”

Depths off shore.—On the south and west sides of the island the 100-fathoms line is about $1\frac{1}{2}$ or 2 miles from the shore: on the north-west and north-east sides, nearly 4 miles; and off San Cristoval point, the south-eastern extreme, it is 3 miles from the coast.

Tides.—It is high water, full and change, at Gomera island at 0h. 45m.; springs rise 9 feet (approximate).

HIERRO or FERRO ISLAND.—The south-western island of the Canary archipelago lies 33 miles west of Gomera island; it is 16 miles in length in an east and west direction, and $8\frac{1}{2}$ miles in breadth from its south extreme to the centre of the bight on the north side. The shores of the island are almost inaccessible, and in the middle is a high plateau, well wooded, the highest mountains rising nearly 5,000 feet above high water.

A road leads from port Hierro to Valverde, the capital of the island, which is situated $1\frac{1}{2}$ miles from the coast.

LIGHT.—Orchilla point.—*Projected.*

Population.—The population of Hierro island is estimated at 6,000.

Coast.—The north-west coast of Hierro forms a deep bight known as El Golfo, the shore of which is composed of a continuous high cliff, with rocks above and below water close to its foot; the bight on the south-west side of the island is more clear of dangers.

Salmone rocks extend 6 cables from the eastern entrance point of El Golfo.

Roadsteads.—The only anchorages used are that of Naos on the west side of Restinga point, and port Hierro on the south-east side of the island; neither of them afford shelter except for boats.

Rock.—At 3 cables north of port Hierro, and nearly 2 cables from the shore, there is a rock with less than 6 feet water on it.

Depths off shore.—The 100-fathoms line is nowhere more than three-quarters of a mile from the shore; off Restinga point, the south extreme of the island, rocks extend 2 cables, and the 100-fathoms line is only half a mile from the coast.

Tides.—It is high water, full and change, at Hierro at Oh. 30m.; springs rise 9 feet.

TENERIFE ISLAND, the largest, most important, and most remarkable of the Canary islands, is triangular in shape; Anaga point, its north-east extreme, forming the apex, the north and south sides being about 45 miles long, and the west side 25 miles; the area is about 919 square miles. From Anaga point, the north-east extreme of Gran Canaria island bears S.E. $\frac{1}{2}$ S., distant 45 miles, while the nearest part of the western side of that island is distant from Tenerife 33 miles.

The shores of the island are "steep-to," except at the north-east extreme. In the centre is situated the famous accessible peak, 12,180 feet above high water, the most remarkable feature of the Canary archipelago. The peak was named by the ancients the peak of Teyde, but it is now more generally known as the peak of Tenerife. The cone is very small in proportion, being only 537 feet high, and the crater at its top is about 120 feet deep; two thirds of the entire peak is covered with vegetation.

The island is considered to be exceptionally healthy, and it is annually visited by many persons for either health or pleasure. The population of Tenerife is estimated at 110,500.*

Appearance.—As a rule, when making Tenerife from the northward, between April and October, the land is seldom recognisable till within 20 miles of it; beyond that distance it appears as a haze; the months of January and February, when the sky is slightly clouded, and just before or after rains, are the most favourable months in which to see the peak from extraordinary distances.

* See Admiralty chart :—Tenerife, No. 1,870; scale, $m = 0.5$ inch.

Coast.—The shores are bold, and excepting a few reefs extending from some of the points, all the dangers are visible and close to the shore. The coast, particularly on the west and south-west sides, is formed of high cliffs, broken occasionally by the beds of mountain torrents; along the east shore are some small beaches.

ANAGA ROCKS, about 60 feet above high water, and black, extend one mile in a north-north-east direction from the northern extreme of Tenerife; they are “steep-to” on the north and east sides, but dangerous, and from them Roque Bermejo point bears S.E. $\frac{1}{2}$ S., distant $1\frac{1}{4}$ miles.

Fuera rock, above water, with a depth of 11 fathoms around it, lies 3 cables W.N.W. from the northern Anaga rock.

LIGHT.—The lighthouse, on Roque Bermejo point, from which Anaga point bears S. by E., distant $1\frac{3}{4}$ miles, is a conical tower, painted gray, and 39 feet in height, with keeper’s dwelling attached; it exhibits, at an elevation of 810 feet above high water, a *fixed and flashing white* light, with a period of system of *three minutes*, which, in clear weather, should be seen from a distance of 35 miles.*

Roque Bermejo islet, lying S.E. $\frac{1}{4}$ E., distant $3\frac{3}{4}$ cables, from the lighthouse, is connected to the shore by a reef which covers at high water.

Mancha Blanca.—Three quarters of a mile south of the lighthouse on Roque Bermejo point there is a white conical rock close to the shore, named Mancha Blanca; it, however, frequently appears of a dark colour when seen from the offing.

Anaga point, the eastern extreme of Tenerife, has some detached rocks lying off it, and the bank of soundings extends from it in a north-east direction, nearly 3 miles, narrowing towards Antequerra point, where the 100-fathoms line is only one mile from the shore.

Mancha rock, with 14 feet water on it, lies E. by S., distant $3\frac{1}{2}$ cables from Mancha Blanca; it breaks heavily in bad weather. On the same bearing, and at a distance of more than a mile from the shore, a rock has been reported. From Mancha rock, Antequerra point bears S.W. $\frac{1}{2}$ S., distant $1\frac{1}{2}$ miles, and Roque Bermejo islet appears in line with the northern part of Anaga rocks bearing N. by W. $\frac{7}{8}$ W. There is a depth of 15 fathoms between Mancha rock and the shore.

CAUTION.—When rounding Anaga point the shore should not be approached within 2 miles.

See chart No. 1,870.

* Reported irregular in action. Remark book, Navigating officer, H.M.S. *Ruby*, 1891. Owing to its great height this light is also reported to be obscured by patches of vapour when there is no sign of fog at the sea level.

Antequerra point, about 700 feet above high water, bluff, and projecting some distance from the line of coast, lies S.S.W. $\frac{3}{4}$ W., distant $1\frac{1}{2}$ miles from Anaga point. When seen from the north-eastward it makes as an island, being connected to the main by a lower ridge.

West of Antequerra point the coast forms a small bay, and at $2\frac{3}{4}$ distant from Roquete is the town of San Andres, situated on a sandy shore at the foot of a valley of the same name; the population is about 540. From San Andres the coast trends in a general westerly direction for a distance of 4 miles to Santa Cruz.

Signal station.—There is a signal station, with semaphore, at Roquete about one mile south-west of Antequerra point, with which passing vessels may communicate; the station is about 730 feet above high water.

SANTA CRUZ, the capital of the Canary group, is a town having a population of about 29,000 in 1897; it is the residence of the governor general and chief authorities.*

The appearance of the town is monotonous; the streets, formed by white houses with flat roofs, are narrow but well paved, and lit by electricity, and the few towers and spires of the religious edifices are conspicuous from the anchorage, the most prominent among these is the Torre de la Concepcion, at the southern part of the town.

The Paso Alto battery, north of the entrance, has a flag staff: Fort San Miguel may be distinguished by its dark grey colour, and the mole extending from it; and Cindadela, the new citadel, painted red, with its casemated battery, stands on the high ground near the old fort Almeida, and forms a good mark.

Communication.—A line of steam-vessels from Cadiz makes semi-monthly trips to Santa Cruz and Gran Canaria island. There is steam communication also with London, Plymouth, Liverpool, Glasgow, Havre, Bordeaux, Marseilles, Bremen, Hamburg, Rotterdam, Antwerp, Cadiz, Gibraltar, the coast of Marocco, New Zealand, River Plate, Rio de Janeiro, Cape Town, Havana, West Indies, Senegal, and the west and south-west coasts of Africa, Venezuela, and Colon. Telegraphic communication with all lines via Cadiz and St. Louis.

Coal and supplies.—From 16,000 to 17,000 tons of coal are kept in stock at Santa Cruz, a number of lighters of from 130 to 300 tons capacity being kept ready loaded and are towed to shipping in the bay by a steam tug. The coaling is by bags or baskets, and steam-vessels can be coaled at the rate of from 40 to 50 tons an hour, according to the facilities afforded by the vessel herself, and labour is always available. Strong southerly winds sometimes impede coaling.

* See Admiralty plan:—Santa Cruz, No. 1,856; scale, $m = 5.8$ inches; and view of Santa Cruz on chart No. 1,870.

Provisions abundant and, with the exception of poultry, moderate in price; water is good and brought off in lighters in iron or wooden tanks that are filled at the mole; wood scarce.

Patent slips.—There are two patent slips, which will take up vessels of 180 tons.

Repairs of moderate damages to hull and machinery can be promptly executed. There is a steam crane which will lift 5 tons, also two hand cranes lifting 1 and 4 tons respectively.

Pilots.—The employment of pilots is compulsory by vessels intending to anchor inside the harbour, or to lie at the wharves. The pilot boats have letter P in black on each side of the bow, and a small blue flag with the same letter in white. At night the pilot boats burn a blue light and show a white light.

Tugs.—There are several tugs which transport coal lighters, or tow vessels in or out of harbour.

Hospitals.—Seamen belonging to vessels of war are received in the Military hospital; those belonging to merchant vessels in the Civil hospital.

Quarantine.—Vessels are not permitted to communicate with the shore before obtaining pratique, and are placed in quarantine if they bring foul bills of health, or if they have infectious diseases on board; they are anchored on the south side of the mole, and can obtain coal under certain restrictions.

Storm signals.—The following storm signals are shown from a flag staff at the harbour master's office :—

A flag, diagonal blue and red, indicates that bad weather is expected.

A similar flag, above a black ball, that, owing to the weather, the port is closed.

A similar flag, below a black ball, indicates an improvement in the weather.

A black ball denotes that the port is open.

At night.—A *white* light indicates the approach of bad weather.

A *white* light above a *red* light, that, owing to the weather, the port is closed.

A *red* light above a *white* light shows that the weather is improving.

A *red* light indicates that the port is open.

Trade.—The average number of vessels of all nationalities for the 5 years 1891–1895 both inclusive which annually enter the port is 846, with an aggregate of 1,275,000 tons. In 1895, a total of 425 vessels entered, having a tonnage of 828,660 tons; and foreign vessels 449 aggregating 555,227 tons; this excludes interinsular vessels.

The exports consist of tomatoes, potatoes, bananas, onions, wine, cigars; and cochineal; the imports, manufactured goods, hardware, ironmongery, general provisions, and Colonial produce. The total value of articles

See chart No. 1,856.

exported from Tenerife in 1895 was £769,924, and those imported £710,332; in 1898 133,480 tons of coal were imported. Santa Cruz is a free port. Sea fishing is carried on by 645 small sailing vessels and boats; the principal fish are tunny, sardines, and mackerel.

Santa Cruz bay is more frequented than any other anchorage in the Canary archipelago. The bay is open to all winds between E. by N. and S.W., and a swell generally sets in, in consequence of the prevailing winds being from the eastward. S.E. gales are of rare occurrence, and vessels may ride them out at the anchorage, although it is usual to slip and go to sea.*

Harbour works.—A mole extends from the northern side of fort San Cristoval in an easterly direction, with two elbows, for a distance of about $1\frac{3}{4}$ cables; it then turns north-east, in which direction it will be further extended for a distance of about $4\frac{3}{4}$ cables: in 1899 about $1\frac{1}{3}$ cable of this distance was complete, and from the completed extremity a submerged portion, in course of construction, and over which there are depths of from 16 to 26 feet, extended for a distance of about 2 cables.

There are landing steps in the harbour.

LIGHTS.—The following lights are shown from the mole in progress of construction:—At the extremity of the mole a conical-shaped movable tower, painted lead colour, exhibits, at an elevation of 36 feet above high water, a *fixed red* light, which should be visible, in clear weather, from a distance of 4 miles. The tower is moved as the work progresses.

On the elbow of the mole a hexagonal-shaped tower, 21 feet in height and painted white, exhibits, at an elevation of 38 feet above high water, a *fixed white* light which should be visible, in clear weather, from a distance of 9 miles; but owing to the electric lights of the town it is difficult to distinguish.

Bell buoy.—A bell buoy, painted red, is moored about $\frac{1}{6}$ of a cable from the extremity of the submerged portion, and N.E., distant $2\frac{1}{2}$ cables from the lighthouse at the extremity of the completed portion. Vessels should not attempt to pass between the buoy and the visible extremity of the breakwater.†

A mole extends from the south side of fort San Miguel, in a south-easterly direction, for a distance of about three-quarters of a cable.

Buoy.—A buoy, painted red, is moored, in 18 feet water, E. by S. $\frac{1}{2}$ S., distant $1\frac{5}{10}$ cables from the church of the Conception, off a reef which extends from the shore. The present position is not to be depended on.

Landing.—From April till October, the season of regular trade winds, the sea is heavy and landing difficult.

* See Admiralty plan:—Santa Cruz, No. 1,856; scale, $m = 5.85$ inches.

† It is reported that the machinery of this buoy is defective; too much reliance should not be placed on it, 1897.

Anchorage.—The anchorage, over a bottom of sand and mud, is protected from winds from S.W., through West, to N.N.E.

Steam vessels generally anchor at from one to two cables north-east of the breakwater, in from 20 to 25 fathoms water; vessels in quarantine, south of the breakwater, in depths of from 30 to 35 fathoms.

In strong southerly winds, which prevail during the winter months, and cause a sea in the roadstead, moderately good anchorage will be found north of the breakwater, in from 7 to 8 fathoms water.*

Off San Miguel valley, at the northern part of the anchorage, large vessels have held on with off-shore squalls, when others have dragged off the bank.†

Directions.—On making the north-east extreme of Tenerife, haul in upon the bank of soundings after passing Antequerra point; the bank, to the 100-fathoms line, extends about $1\frac{1}{2}$ miles from the shore until abreast of Santa Cruz, where it narrows to half a mile; having selected the depth of water for anchoring, run along shore in that depth; this will afford time to anchor leisurely.

After rounding Antequerra point, if going into Santa Cruz under sail with the N.E. trade blowing outside, it is necessary on approaching the anchorage to keep close along the shore to ensure fetching in; for when nearing the town the wind will generally be found to head.

Sailing vessels approaching Tenerife from the south-westward during the summer months, and intending to anchor in Santa Cruz bay are recommended to keep on the west side of the island, so as to profit by the *embata* or wind from the shore.

Off Teno point the trade wind will be encountered, but though violent and squally in the vicinity of this point, it becomes moderate when northward of it.

During the winter months, vessels approaching from the south-westward are recommended to keep on the eastern side of the island.

Currents.—South of Tenerife the current sets to the westward, sometimes strongly; on the east coast, to the south-west, the direction and strength being influenced by the wind.

CAUTION.—When nearing Santa Cruz in a sailing vessel, the town should not be brought to bear northward of West, to avoid calms; and it should be remembered that the current sets to the south-westward, also that at times the land is not easily made out, especially at night, owing to

See chart No. 1,856.

* It is stated that the construction of the mole interferes with the anchorage in the roadstead.

† The weather in the early part of April 1886 was unusually severe; full power steam-vessels returning to the anchorage, being unable to face the N.N.E. gale which was blowing.—Captain W. F. Castle, H.M.S. *Sappho*, 1886.

clouds hanging over it, and thick weather is sometimes experienced, especially in the month of February.

Tides.—It is high water, full and change, in Santa Cruz bay at 1h. 30m. ; springs rise 8 feet, neaps 6 feet.

Tidal streams.—The tidal streams set, flood to north-east, ebb to south-west.

HIDALGO POINT, the north extreme of Tenerife, is a low, sandy, and foul point with high land rising immediately behind it, it bears W. $\frac{3}{4}$ N. distant $9\frac{1}{2}$ miles from the northern Anaga rock, the intervening coast forming a bight, the eastern side of which is foul for a short distance from the coast, and the western shore clean.

Viento point bears W. by S. $\frac{1}{4}$ S., distant 3 miles, from Hidalgo point ; between these points are two bays, La Hoya, the eastern, affording good landing.

Madera point.—From Viento point the coast trends in a west-south-west direction in a nearly straight line for a distance of $3\frac{1}{4}$ miles to Madera point, which is high and steep, and N.N.E. from which, distant a third of a mile, is situated a rock, on which there is less than 6 feet water.

Barranco Honda point bears S.W. by W. $\frac{1}{4}$ W., distant 6 miles from Madera point ; it is a high, steep point ; with a rocky islet close to it.

Puerto Orotava.—The richest and most fertile part of the island is situated $3\frac{1}{4}$ miles, W. $\frac{1}{2}$ S., from Barranco Honda point, and 28 miles westward of Anaga point, in the bight which forms the north side of the island. During winter N.W. winds render this place dangerous for shipping. Orotava, containing 4,720 inhabitants, is built at the foot of a mountain slope, and numerous detached rocks fringe the shore which should not be approached within half a mile to the eastward of the town.*

The old town or Villa de Orotava is situated, at an elevation of 1,042 feet above high water, about 2 miles to the southward of Puerto Orotava, and has a population of 8,876. Within the last few years Orotava has become a favourite winter resort, especially for invalids, and a large hotel has been built. The old town is lit by electricity, also the hotel, and it is stated that the lights of the latter may be seen from a distance of 10 miles.

There is a small artificial harbour formed by two moles, the western one slightly overlaps the eastern. Landing for boats may be obtained at all seasons inside this harbour. A British Vice-Consul resides here and there is a post office, a botanical garden, and a sanatorium for consumptive patients.

* See plan of Puerto Orotava ; scale, $m = 1\cdot0$ inch, on chart No. 1,870.

Communication.—There is telegraphic communication with Santa Cruz and with other towns; cargo steamers call at the port irregularly.

Anchorage.—Vessels usually anchor off Puerto Orotava in 50 fathoms water, with the peak of Tenerife bearing S.W., about three-quarters of a mile off shore. The anchorage is exposed to the prevailing northerly winds, but is recommended as affording good shelter from S.E. winds and is in easy communication by road with Santa Cruz.*

Buenavista point bears W. by N. $\frac{1}{8}$ N. distant 15 miles from Puerto Orotava, the intervening coast forming a succession of small bays and bights, in the western and most extensive of which is situated the town of Garachico.

Garachico, situated 3 miles south-east of Buenavista point, is a town containing about 3,000 inhabitants, built on a steep round bluff, and fronted by El Roque, a circular rocky islet, lying $1\frac{1}{2}$ cables from the shore.

There is a mole, 150 yards long, built on the side of a sand bank which extends north-east from a creek: it is only useful for boats landing in fair weather.

Anchorage may be obtained on either side of El Roque islet, in from 12 to 18 fathoms water, but the anchorage is exposed to winds from East, through north, to West, and the holding ground is indifferent.

TENO POINT, the north-west extreme of Tenerife, is a small peninsula, bearing about W. by S. from Buenavista point, the intervening 6 miles of coast being tolerably straight.

LIGHT.—On Teno point, a cylindrical-shaped lighthouse, 24 feet in height, and painted light grey, exhibits, at an elevation of 148 feet above high water, a *fixed red* light which should be visible, in clear weather, from a distance of 12 miles. The keeper's dwelling is rectangular in shape, and painted white and grey.

Coast.—From Teno point the coast trends in a general S. by E. direction for a distance of 24 miles to Rasca point, the south extreme of the island; it is formed of rugged basalt, in some places worn into columns, and is generally clean, the rocks extending but a short distance from the shore.

The south-east coast of Tenerife is also clear of off-lying dangers and may be approached within a moderate distance.

Anchorage.—Between Teno and Camisa points, a distance of nearly 20 miles, known as the shore of St. Juan, anchorage may generally be obtained, in from 5 to 9 fathoms water, over sand, at about a cable from the shore. In front of the ravine of Juan Lopez the anchorage in $12\frac{1}{2}$ fathoms, over sand and rock, is sheltered from winds from North, through east, to S.E. and water may be obtained.

See chart No. 1,870.

* Commander Peyton Hoskyns, H.M.S. *Blonde*, 1896.

In front of the ravine del Aqua, the anchorage is in 9 fathoms, over coarse sand, and here also water may be procured; and in port San Iago, in from 6 to 13 fathoms, over sand and rock.

Port Cristianos, situated to the southward of Camisa point, off which latter, reefs extend for a distance of 2 cables, is said to be a fair summer anchorage with good holding ground, but with West or S.W. winds it offers no security. The anchorage is in from 9 to 10 fathoms water, over sand, with Cayofeto hill bearing about N. $\frac{1}{2}$ E. and the south extreme of Camisa point N.W. $\frac{1}{2}$ W.

Anchorage may also be obtained east of Rasca point in about 9 fathoms water, over rock and sand, sheltered from winds from West, through north, to E.N.E.

LIGHT.—On Rasca point a cylindrical-shaped lighthouse, 24 feet in height, and painted light grey with a green lantern, exhibits, at an elevation of 66 feet above high water, an *occulting white* light, having a period of system of *thirty seconds*, which should be visible, in clear weather, from a distance of 13 miles, over an arc of 180°. The keeper's dwelling adjoining, also coloured light grey with a flat roof, is situated about 300 feet from the coast.

GRAN CANARIA or GREAT CANARY ISLAND, containing about 98,000 inhabitants, is of circular form, with an area of 631 square miles, 25 miles in diameter and very mountainous. Los Pexos, the highest ridge, is 6,400 feet above high water and about 2 miles to the northward of it, Roca Nublado, 6,110 feet high shows, from the north-east, as an isolated pillar of rock.*

The island is more fertile and better watered than any other of the group, and most of the land capable of irrigation is under cultivation; walnut, chestnut, oak and fir trees grow in abundance, and the apple, almond and fig trees thrive. Bananas, cochineal, oranges, potatoes and tomatoes are largely grown, and excellent roads are being constructed in most parts of the island.

When seen from seaward, Gran Canaria island appears high in the centre, with a broken and serrated slope on either side to the sea; Isleta, the northern portion, appears as a detached conical islet when seen from the eastward or westward. The coast is generally high and bluff, being everywhere free from off-lying dangers, except off a few points on the east side.

LIGHT.—On Sardina point, the north-west extreme, from a cylindrical tower, 20 feet in height, painted grey with green lantern and white dwelling attached, a *fixed white* light is exhibited, at an elevation of

See chart No. 1,870.

* See Admiralty chart :—Gran Canaria island, No. 1,869; scale, $m = 0.5$ inch.

105 feet above high water, which should be visible, in clear weather, from a distance of 12 miles.

North coast.—From Sardina point the coast trends in an E. by S. direction for $3\frac{1}{2}$ miles to punta Guadalupe and contains Galdar bay, on the south-east side of which is mount Galdar, 1,533 feet above high water, with the town of Galdar, the ancient Guanche capital, situated on its western slope; from this town there is one of the easiest routes to the interior.

Sombrero point is $6\frac{1}{2}$ miles in an east-south-east direction from punta Guadalupe; Bañaderos bay, occupying the eastern 3 miles of this distance. Galdar and Bañaderos bays, being open to the prevailing winds are dangerous anchorages.

Confital bay, on the west side of Isleta peninsula, being much exposed to the swell, is only suitable as a harbour for small craft within a reef of rocks in its south-east corner, but the bay would afford shelter to a vessel in a S.E. gale.

Confital point, on the northern side of the bay, is formed of rocks and cliffs surmounted by a hill, which falls perpendicularly, like a wall, on its southern side.

Isleta peninsula, the north-east extreme of Gran Canaria island, lies S.E. $\frac{1}{2}$ S., distant 45 miles from the north-east extreme of Tenerife, it is about 800 feet above high water and clifly, being connected to the island by Guanarome isthmus, a low sandy neck, $1\frac{1}{2}$ miles long, and 600 yards wide, on which there are several houses. Some rocks extend north-east of the peninsula for nearly half a mile.*

Morro de la Vieja, a small hill of peculiar form, forms the north point of Isleta peninsula.†

LIGHT.—The lighthouse upon Isleta peninsula, standing on the summit of the highest and most northern hill, is a conical shaped tower 31 feet in height, painted a dark grey colour, with a white lantern; it exhibits, at an elevation of 817 feet above high water, a *fixed* and *flashing white* and *red* light, with a period of system of *two minutes*.

This light, which is stated to be irregular in the intervals of time, is reported (1898) as showing *fixed white* for *forty seconds*; eclipsed for *seventeen seconds*; *red flash* for *six seconds*; eclipsed for *seventeen seconds*; and again *fixed white* for *forty seconds*; the *white* light should be visible, in clear weather, from a distance of 18, and the *red* light from a distance of 12 miles between the bearings of N. $\frac{1}{8}$ E., through north, to E. by S. $\frac{1}{3}$ S.

See chart No. 1,869.

* See Admiralty chart:—Las Palmas bay, No. 578; scale, $m = 3.55$ inches.

† The hill, on which the watch tower stands, has "Gran Canaria Engineering Company" painted in large white letters, as an advertisement, on its south-east face; this is very conspicuous. Remark Book, Navigating Officer, H.M.S. *Phæbe*, 1892-93.

Signal station.—There is a Lloyd's signal station situated close to the eastward of the watch tower on the summit, near the middle of Isleta peninsula; the Intermediate Code of Signals is used.

Pilots can be obtained for berthing vessels at La Luz harbour.

El Becerro, a shoal about a cable in length, which breaks in a fresh breeze, is situated about $1\frac{1}{2}$ cables north of Morro de la Vieja, and close to the eastward of it is La Vaca which does not show; there is a channel for small vessels in fine weather between these shoals and the land.

Las Bajas or North rocks, 6 cables, E.S.E. of La Vaca, extend nearly $3\frac{1}{2}$ cables from the north-east point of Isleta peninsula; they are not awash at low water, but show by breakers.

It is prudent not to approach the northern side of Isleta peninsula within a distance of one mile.

El Nido or Sphinx head, on the east side of Isleta peninsula, has a small island, about 10 feet above high water, named El Roque, lying about $1\frac{1}{2}$ cables south-east of it.*

South-west of El Roque, and near the northern approach to La Luz harbour, are the following dangers:—

Las Silletas are two rocks with depths of from 6 to 10 feet on them; the northern one lies with El Roque bearing N.E. by E. $\frac{7}{8}$ E. distant $5\frac{1}{4}$ cables; and Isleta signal station N.W. by W. $\frac{1}{4}$ W. The southern one lies about half a cable S.W. $\frac{1}{2}$ S. from the northern.

Marqués de la Ensenada is a rock lying with El Roque bearing N.E. by E. $\frac{3}{8}$ E., distant 9 cables; and Isleta signal station N.N.W.

Las Tintoreras shoal has two pinnacle rocks on it awash at low water, and is almost connected with the coast westward of it. From its east extreme El Roque bears N.E. by E. $\frac{3}{8}$ E., distant $1\frac{2}{10}$ miles, and Isleta signal station N. $\frac{1}{4}$ E.

La Luz harbour, the port of Las Palmas, which has come greatly into prominence of late years as a coaling station, on the south side of Isleta peninsula, lies between El Nido head, to the north-east, and Palmas point, on which stands the city of Palmas, bearing from El Nido head S.S.W. $\frac{1}{8}$ W. distant nearly 4 miles; the coast of the bay between these points recedes $1\frac{1}{4}$ miles.

Though exposed to the S.E., vessels may lay at anchor in this bay all the year round. There is always a swell setting in when the trade wind is blowing, but not sufficient to prevent a vessel from coaling. The bay is quite clear, with a sandy bottom.†

La Luz harbour is exposed to the S.E., but winds from that direction are unusual, and seldom strong. They do not occur between March and November.

See chart No. 578.

* The rock, formerly shown on the chart, bearing E.N.E., distant nearly 2 cables from the centre of El Roque, does not exist, and has been expunged from the chart.

† See plan of La Luz harbour on Admiralty chart No. 578.

La Luz harbour consists of an outer and inner harbour, the latter being formed by a breakwater extending nearly $6\frac{1}{2}$ cables in a S.S.W. direction from a position about one cable west of San Fernando battery; for the last 3 cables it inclines slightly to the westward. The outer harbour is between the extremity of the breakwater and the shore. The depths in the inner harbour are from 6 to 8 fathoms alongside the breakwater, gradually shoaling everywhere towards the shore.

Vessels, drawing 25 feet water, can go alongside, the breakwater wharves.*

From a position about 4 cables to the northward of Sta. Catalina point, a mole is in course of construction; it has an easterly direction, and in 1898 was completed for a distance of about a cable from the shore.

LIGHTS.—A *fixed green* light is shown from an iron lamp post 14 feet in height, on the end of the east mole at an elevation of 23 feet above high water, and should be visible, in clear weather, from a distance of 6 miles. The light, which is reported to be dim, is unreliable.

On the western side of the breakwater there is a row of 20 lamp posts showing white lights.

Buoys.—Six mooring buoys, painted white and lettered, are moored on the northern side of the inner harbour; cylindrical buoys, painted red, and moored in depths of from 13 to 26 feet mark the shoal water off the town, and two similar buoys are moored on each side of the extension works of Catalina pier.

Communication.—Daily with Liverpool and London by passing steamers; weekly to Cape of Good Hope, London, Liverpool, Hamburg, Marseilles, Barcelona, Genoa, and South America; and fortnightly to Cadiz by Spanish line. A steam tramway runs to Las Palmas. Telegraphic communication with Tenerife, thence to Cadiz; to stations on the African coast viâ San Louis, and with Palma viâ Tenerife, and direct with Lanzarote.

Dangers.—A rocky patch with a least depth of 14 feet at low water, spring tides, is situated N.E. $\frac{1}{2}$ N., distant $2\frac{1}{10}$ cables from Sta. Catalina castle and W. by N. from the extremity of the breakwater; from this position the patch extends S.S.E. for a distance of about half a cable, the depth at the south-east end being $2\frac{3}{4}$ fathoms. For a distance of about one cable, north-east of the rocky patch, the depths are reported to be one fathom less than shown on the chart.

Coal and supplies.—From 24,000 to 30,000 tons of coal are stored at La Luz harbour, which may be obtained at about 18 shillings per ton, placed on board. Lighters varying from 10 tons to 250 tons are towed alongside by a steam-tug of which there are several. Several new lighters of 250 tons capacity have been recently built on the model of the Thames

See chart No. 578.

* Some proposition has been made to construct a military port to the eastward of the present harbour.

barge; the coal is put into bunkers; but it would be more expeditious for vessels of war to hoist it in with their own men. The best berth for coaling is as near the end of the mole as convenient. S.E. gales prevent or impede coaling, but this rarely happens.

Each firm has its own distinguishing International Code flag which may be hoisted by vessels when in sight of the island, and about 3,000 tons of coal is always kept afloat in the lighters ready for immediate shipment. The general rate of coaling is from 50 to 60 tons per hour, but in a record case 132 tons were taken on board in an hour.

Vessels can be coaled at night, several lighters being fitted with electric lighting apparatus, but in the case of ships in quarantine work ceases before sunset.

The health officer has to give pratique before coaling can begin.

A plentiful supply of excellent water, with floating tanks and steam pumps, and abundance of bread and fresh provisions.

Repairs.—Messrs. Blandy Brothers & Co. have facilities for undertaking large repairs to machinery, sheers which will lift 20, and cranes 5 and 3 tons, and divers are available when required; there are also other repairing shops, only equal to undertaking small repairs. Wooden vessels of 200 tons have been built.

Patent slips.—The patent slip is 120 feet in length on the cradle, 500 feet over all, and the breadth of the cradle is 20 feet, with a depth of 8 feet on the fore end and 12 feet on the after end, at high water, spring tides. The lifting power of this slip is 200 tons, but an extension is in course of construction (1898), the dimensions being 203 feet in length on the cradle, 500 feet on the blocks, 30 feet breadth of cradle, with the same depths at fore and aft ends as above; when completed, the lifting power will be increased to 1,000 tons.

Spanish torpedo boats of the first class have been taken up on the slip. The dimensions of the largest vessel hauled up (1898) are, length $96\frac{2}{3}$ feet, breadth $27\frac{2}{3}$ feet, and a draught of 9 feet 2 inches.

Quarantine regulations.—Unless special quarantine regulations are temporarily in force, vessels are generally allowed to coal in the inner harbour; the yellow quarantine flag should be hoisted until vessel is boarded, and if necessary, and previously advised, the health officer will visit at any hour.

Hospitals.—There is a British Seaman's hospital, supported by subscription, receiving seamen at the rates of 2s. 6d. per diem, and a Spanish hospital where the terms are 2s. daily.

Pilotage.—The pilotage and port dues are small, but an extra charge is made in the case of a vessel being made fast to a buoy, or moored head and stern. Pilot boats show a red flare at night.

See chart No. 578.

Telegraph cable.—A buoy, painted red and white in vertical stripes, with the word *Telegrafos* on it, is moored over the telegraph cable to (Lanzarote) southward of La Luz harbour, in a depth of 5 fathoms, with Santa Catalina castle bearing N.N.W. $\frac{3}{4}$ W., distant 4 cables.

Vessels are prohibited from anchoring in the vicinity of the telegraph cable, the direction of which is indicated by the telegraph buoy in line with the cable house.

Trade.—In 1898, the imports, consisting of cotton and woollen goods, manures, alcoholic liquors, cereals and grain, machinery, cement, and soap, amounted to 438,412*l.*, and about 213,000 tons of coal was imported. The exports, chiefly bananas, tomatoes, potatoes, cochineal, and wine, amounted to 218,863*l.* In the same year, 2,831 vessels of 3,890,664 gross tonnage entered the port.

Anchorage.—Between El Roque and the east breakwater of La Luz, vessels should not anchor within a distance of half a mile from the shore, on account of the cross and troubled sea that often prevails in that neighbourhood. A good berth is in 12 fathoms water with El Nido head bearing N.E. $\frac{3}{4}$ N., and Santa Catalina castle W. by N. distant about three-quarters of a mile. At night a large vessel should anchor farther out, in about 15 fathoms. Vessels of war are usually secured to mooring buoys.

NOTE.—With Santa Catalina castle bearing W. $\frac{1}{2}$ N., distant about 5 cables, ships have reported loss of anchors from rocky bottom.

Should the harbour be crowded, anchorage may be obtained in about 6 fathoms water at 3 cables eastward of Santa Catalina castle; this anchorage is stated to be a comfortable one with N.E. or East winds and swell.

Eastward of the breakwater for a distance of 3 or 4 cables, the back wash of the land and breakwater raises a broken, choppy sea, sometimes dangerous for boats.

With the wind north of N.N.E. anchorage may be taken up in a space extending about $2\frac{1}{2}$ cables in a south-westerly direction from the pier head; here the holding ground is said to be very good. Inside a line joining the pier head and the Hesperides coal wharf, and to a line joining the present extremity of Catalina pier and Messrs. Swanston's coal stores, the anchorage is good with all winds except those between East and S.E.; westward of the latter line is a space reserved for coal lighters and small craft.*

Early in November, at the breaking up of the summer, when strong winds from S.E. and S.W. prevail, it is advisable to have a longer scope of cable, as the holding ground, consisting of sand towards the breakwater

See chart No. 578.

* Alec Ferguson, Esq., H.B.M.'s Vice-Consul, Las Palmas.

and rocky ground towards the shore, cannot always be depended on ; these winds come in squalls with short intervals of calm.*

The following regulations have been adopted for the berthing of vessels in La Luz harbour :

1. Steam vessels, intending to remain longer than 24 hours, shall moor within the port, head to the southward with two stream anchors astern. Those intending to remain only a few hours may lie at single anchor.

2. Sailing vessels, upward of 500 tons displacement and of not less than 13 feet draught, may anchor in the port clear of the entrance channel. Those of less tonnage will be berthed alongside the pier, or in a position indicated by the port authorities. Saluting, inside the harbour, is not permitted.

Directions.—The lighthouse on the extremity of the outer pier head, bearing N.W. $\frac{1}{4}$ W. leads to the entrance of the harbour, and vessels should not approach Santa Catalina castle, nor the western side of the harbour, under a distance of $2\frac{1}{2}$ cables, to avoid the rocky patch, previously noticed, lying 2 cables distant from the latter. Isleta lighthouse, just shut in by the signal tower, bearing N. by W. $\frac{7}{8}$ W., clears the shoal water on the west side of the entrance.

At night.—Isleta light just shut in by the signal station hill bearing N. by W. $\frac{7}{8}$ W. ensures being east of all shoal water off the west side of the entrance ; with the light open a vessel will be in less than 4 fathoms water.

Isleta peninsula light is not visible from the anchorage in La Luz harbour.

Tides.—It is high water, full and change, in La Luz harbour at Oh. 52m. ; springs rise $11\frac{1}{2}$ feet.

Las Palmas.—The city of Las Palmas, the capital of the island, with a population of about 40,000, is built along the beach in a valley of palms and other luxuriant trees, and may be recognised from the whiteness of the buildings and the cathedral which is conspicuous from seaward ; it is extending in all directions, and the electric light has been recently introduced. The city is divided by the Guiniguada ravine which is spanned by a bridge of three arches connecting the two parts. Fort Del Rey is on the western side of the hill of San Francisco, which rises immediately over the city.

LIGHT.—A *fixed red* light is exhibited, at an elevation of 25 feet above high water, from an iron standard 15 feet in height, situated 132 yards, from the mole head of Las Palmas ; it should be visible, in clear weather, from a distance of 6 miles.

Communication.—A steam tramway runs to La Luz harbour, and there is telegraphic and telephonic communication.

Supplies.—Las Palmas is well supplied with all kinds of provisions.

See chart No. 578.

* Remark book, Navigating Officer, H.M.S. *Curacoa*, 1897.

Landing may be generally effected inside the mole, where there are good steps for boats, and the water is smooth, but at times it is difficult and even dangerous, when the pilots hoist a black and white flag, in horizontal stripes, as a signal that boats should not attempt it.

Gando bay.—From Las Palmas the coast is rocky, indented and fringed with rocks for a distance of 11 miles in a southerly direction to Gando point; Ginamar and Melenara points, situated 4 and 7 miles southward of Las Palmas, have rocks extending 2 and 3 cables respectively to the eastward from them. At Melenara point, there is a small creek affording good landing.

Over Telde, $2\frac{1}{2}$ miles inland, the land is very fertile, and fruit and tomatoes are grown. Gando point is the north-east entrance point of Gando bay which is $4\frac{1}{2}$ miles across between Gando and Areynaga points, and $1\frac{1}{4}$ miles deep. Gando rock, lying about 6 cables northward of Gando point is a small off-lying islet, black in appearance and 75 feet above high water.

LIGHT.—Gando point.—*Projected.*

Gando reef, distant $6\frac{1}{2}$ cables in an E. by N. $\frac{1}{2}$ N. direction from Gando point, is seldom awash, but at two hours after high water gives the appearance of a tide rip, and as the sea does not always break on it is dangerous. The reef has three crests, is about 160 feet in length by 30 feet in breadth, and rises abruptly from the bottom, having, at less than a quarter of a cable from it, depths varying from 7 to 17 fathoms. As several vessels have been lost on this reef, it is advisable to give it a wide berth.

Clearing mark.—To clear Gando reef, keep the whole of the Isleta peninsula open of the main island, bearing N. $\frac{5}{8}$ W.

Port Gando on the north side of Gando bay, is $1\frac{1}{3}$ miles wide in an east and west direction and 6 cables deep. It affords sheltered anchorage from all winds except those between east and south, and although strong northerly and north-east winds raise a heavy swell outside, but little is experienced at the anchorage.*

The holding ground, composed of sand and mud, is good, but within a cable of the eastern side of the bay the bottom is rocky, and on the western side is composed of sand. Gando village is a small collection of houses, the eastern of which is painted yellow; there is a large Lazaretto apparently unused.

Supplies.—Fresh provisions, obtained from Las Palmas during the visit of the Training Squadron in 1897, were sent by water: the main road to Las Palmas passes about $2\frac{1}{2}$ miles from Port Gando.

See chart No. 1,869.

* See plan of Port Gando on Admiralty sheet No. 886; scale, $m = 6$ inches

There is a well of fresh water close to Gando tower, which latter is most conspicuous on the west side of the anchorage; the water is not recommended for drinking purposes.

Landing.—The best landing place is on the sandy beach near the Lazaretto; but it is not practicable at all times, in ship's boats, on account of the surf.

LIGHT.—**Areynaga point.**—A *fixed red* light is exhibited, at an elevation of 154 feet above high water, from a cylindrical-shaped lighthouse 21 feet in height, painted a dark red with a green lantern, and situated in the centre of a rectangular shaped one-storied building painted white and red, situated on Areynaga point; it should be visible from a distance of 12 miles in clear weather, through an arc of 180° from about $1\frac{1}{3}$ miles eastward of Gando point to Tanife point.

Coast.—A rocky islet, about 25 feet high, 150 yards in extent, and steep, lies about 3 cables off shore, with the lighthouse on Areynaga point, bearing N.N.W. $\frac{3}{4}$ W.; a reef extends half a cable south-east of the islet, and the channel between the islet and the shore has only depths of from 9 to 16 feet.

At 4 miles south-west of Areynaga point is Tanife point, and between Areynaga bay, clean but shallow. Port Tenefe, in the north part of the bay, affords good landing.

About a mile west of Tanife point there are salt works, and the open roadstead, sheltered from northerly winds, is much resorted to by fishing boats for salt to preserve fish caught on the African coast.

From Tanife point the coast continues clean, but shallow, for 9 miles to Maspalomas point, the south point of the island, which is covered with heaps of whitish sand, and silting is reported in the locality.

LIGHT.—On Morro Colchas point, $1\frac{1}{3}$ miles west of Maspalomas point, a cylindrical-shaped stone tower, 187 feet in height and painted a bluish grey colour, surmounting a rectangular building, exhibits, at an elevation of 190 feet above high water, a *fixed white* light which should be visible, in clear weather, from a distance of 20 miles, between the bearings of E. by S. $\frac{2}{3}$ S. and W. by S. $\frac{1}{3}$ S. The lighthouse is situated 49 feet from high-water mark.

There is a small landing mole at the lighthouse.

Anchorage.—Maspalomas anchorage, about one mile north-west of Morro Colchas, affords anchorage in 7 fathoms water, over sand, at about a third of a mile from the shore, which is, in the whole bight between Maspalomas lighthouse and Touza point, fringed, for a distance of 50 yards, with boulders.*

See chart No. 1,869.

* See plan of Maspalomas anchorage; scale, $m = 4 \cdot 9$ inches on Admiralty chart No. 1,869.

H.M.S. *Dido*, August 1898, when at this anchorage, experienced frequent squalls from all directions; those blowing off the land had the greatest strength, and were accompanied by a sudden rise in the temperature of more than 26° Fahr., but on the south coast, between Tanife point and cape Descolorado, the trade was never felt, but variable winds and calms prevailed.

Immediately west of Touza point is Arguineguin bay, which also affords good anchorage, at about 3 cables from the point, in $5\frac{1}{2}$ fathoms water, over sand; this bay appeared to be free from the squalls, experienced above, at Maspalomas anchorage.

There is a good beach for landing at Arguineguin, and the valley is well cultivated, with plenty of water.

Coast.—From Touza point to cape Colorado, a distance of 18 miles, the coast is also clear. Tomatoes and potatoes are grown in the vicinity of Mogan point, and steamers call there occasionally.

Aldea point, $2\frac{1}{2}$ miles north-east of cape Colorado, has anchorage in the bay, of the same name, close south of the point. The valley of Aldea is very fertile, but the village lies low, is very hot, and fevers are prevalent. The roads to the interior are both difficult and dangerous, but a new road is being constructed. From Aldea point the coast trends for $5\frac{1}{2}$ miles in an east-north-east direction, to Tomadana point, and at $3\frac{1}{2}$ miles is Arenas point, off which there are a few rocks.

Nieves bay, between Tomadana point and Hongo rock, affords good anchorage in the summer months, in from $8\frac{1}{2}$ to 11 fathoms water, between the mole and the hermitage of Las Nieves, and in the winter months in from 14 to 16 fathoms, over sandy bottom. This is the shipping port of the L'Agate valley, which is covered with pine woods, the village being scattered on the slopes of the mountains behind; the district is very fertile, fruit and vegetables are abundant, and fresh water plentiful. There are sugar estates, a tinning factory, and cattle, sheep, and goats are raised.

Sardina bay, about a mile south of Sardina point, is said to be a good anchorage, sheltered from winds between North, round by east, to S.S.E.; it is frequented by sailing vessels trading to Tenerife.

Depths off shore.—It may be said generally that the soundings to the 100-fathoms line extend further off this island than any other of the group.

On the meridian of Isleta peninsula, at a distance of about one mile from the shore, the depth is 100 fathoms, and the same depth is maintained at that distance along the north shore of the island. Off La Luz harbour the bank to the 100-fathoms line extends $2\frac{1}{2}$ miles; off the other portions of the island the 100-fathoms line follows the conformation of the coast, in some parts at a distance of 5 miles.

FUERTEVENTURA ISLAND.—The extreme length of this island is 53 miles in a north-east and south-west direction, and its greatest breadth 16 miles; it has an area of 797 square miles. From a distance it appears as two islands, the south-west portion being a mountainous peninsula about 11 miles long, separated from the main island by Matas blancas, a low white sandy neck, about 7 miles in length and $2\frac{1}{2}$ miles in breadth. Population about 10,000.*

Fuerteventura is mostly barren, but some of the valleys produce date palms and fig trees; the coast, generally high and steep, is indented with numerous small bays and coves with sandy beaches.

The northern portion of the island consists of a group of extinct volcanic mountains; mount Muda, at the north-east part, being 2,240 feet above high water. Near the centre of the island the ridge divides, and following the coast on either side, unites again to the south-west, in a ridge from 1,500 to 2,200 feet above high water, which falls abruptly to the sandy neck, connecting the two portions of the island.

Jandia peninsula, the southern portion of the island, is occupied by a remarkable mountain, 2,770 feet above high water, named Asses' Ears, from its most prominent feature. The mountain is perpendicular on its north-west side; on the south side it slopes gradually to the east towards the sandy neck, and to the westward it terminates in Jandia point.

Gorda point, the north-east extremity of the island, is low and foul for 3 cables to the north-east. Off the point, and between it and Lobos island, 3 miles to the south-eastward, there is a very confused sea when a swell comes from the westward. From the point, Pechiguera point (the nearest part of Lanzarote island) bears N.N.E. $\frac{3}{4}$ E. distant 6 miles, and the lighthouse on Lobos island E. by S. distant 4 miles.†

Coast.—From Gorda point the coast trends west for $7\frac{1}{2}$ miles, when it turns sharply to the south-westward for 28 miles to Amanay point, between which and Pesebre point there is a bight, the shore of which recedes 4 miles from the general trend of the coast.

Tostan reefs, fringing the shore near Ballena point, the north-west extreme of Fuerteventura island, are extensive; the north extreme, with a depth of 3 feet, is distant nearly three-quarters of a mile in a northerly direction from Ballena point and breaks heavily with S.W. winds; thence the edge of the reef has a south-west direction for 2 miles, being parallel to the shore, distant from it in places about three-quarters of a mile. Ballena point and the land about it are low.

LIGHT.—On Ballena point a *fixed white* light is exhibited, at an elevation of 36 feet above high water, from a cylindrical-shaped lighthouse, 21 feet in height, painted light grey, with a green lantern and

* See Admiralty chart :—Fuerteventura island, No. 1,850; scale, $m = 0.5$ inch.

† See plan of Bocayna strait, scale, $m = 1.0$ inch, on chart No. 886.

situated at the northern angle of the keeper's dwelling, rectangular in shape and painted white and grey; the light should be visible from a distance of 9 miles between the bearings of N.N.E. $\frac{3}{4}$ E., through east and south, to W. by S. $\frac{1}{2}$ S.

Pier.—There is a pier near Ballena point for the use of the lighthouse.

Depths off shore.—On the north-west side of Fuerteventura island, the bank to the 100-fathoms line extends about 4 miles off shore.*

Pesebre point.—This point forms the north-west extreme of Jandia peninsula, and is foul for half a mile from the shore; it lies $2\frac{3}{4}$ miles N.E. $\frac{3}{4}$ N., from Jandia point. The intermediate coast is low, and fronted by flat sandy beaches, with numerous off-lying rocks.

Jandia point, the south-western extremity of Jandia peninsula, is a low shelving point, with rocks extending 2 cables from the shore, which should not be approached nearer than one mile.

LIGHT.—The lighthouse on Jandia point, the south-west extremity of Fuerteventura island, is a conical-shaped tower, 62 feet in height, of a grey colour, and attached to the south side of the keeper's dwelling; it exhibits, at an elevation of 108 feet above high water, a *revolving white* light, with a period of revolution of *one minute*, and should be visible in clear weather from a distance of 15 miles, between the bearings of S.S.W. $\frac{5}{8}$ W., round by south and east to N.W. by W. $\frac{7}{8}$ W.

Griego reef.—A rock, which uncovers at low water, known as Griego reef, lies S.W. $\frac{1}{2}$ W. distant 6 cables from Jandia point lighthouse. A short distance outside the reef the depth is 15 fathoms, and between it and the shore there are 3 fathoms.

Griego reef breaks, and in the vicinity the current forms whirlpools.

Shoal.—A shoal, with a depth of 18 fathoms, has been reported, bearing W. by S. $\frac{3}{4}$ S., distant 8 miles from Jandia point lighthouse.

Current.—Near the south side of Fuerteventura there appears to be eddy current setting to the northward.†

Depths off shore.—At $2\frac{1}{2}$ miles south-west of Jandia point the depth is 20 fathoms, rocky bottom, and the edge of the bank "steep-to." North-westward from Jandia point lighthouse, the bank to the 100-fathoms line extends 5 miles, deepening gradually from 15 fathoms at one mile from the shore, to 30 fathoms at 3 miles, whence the depth suddenly increases to 75 fathoms; on the meridian of Pesebre point, at a distance of $2\frac{3}{4}$ miles from the shore, the depth is 25 fathoms, increasing suddenly to 100 fathoms.

Bocayna strait, the channel between Fuerteventura and Lanzarote islands, is navigable for vessels of any size, being 7 miles in length, and

* See chart No. 1,850.

† Navigating Officer, H.M.S. *Curaçoa*, 1897.

4½ miles in breadth at its narrowest part, between Lobos island and Papagayo point the south extreme of Lanzarote island.*

Depths in the strait.—Midway between Gorda and Pechiguera points, the western limits of Bocayna strait, and half a mile east of the 100-fathoms line, the depths are 65 and 76 fathoms, over fine sand, whence it shoals gradually to Gorda point, but towards Pechiguera point the bottom is even, there being 64 fathoms within half a mile of the shore; on the parallel of Pechiguera lighthouse the 100-fathoms line approaches to within 5 cables of the shore. In the eastern part of Bocayna strait the water gradually shoals to 20 fathoms between Martino and Papagayo points, and one mile further east the depth suddenly increases to more than 200 fathoms.

LOBOS ISLAND, about 5 miles in circuit, is situated one mile off the north-east extreme of Fuerteventura island; a narrow passage, with 6 fathoms water, lies between them. The island is without fresh water, surrounded by rocks, and its summit is 360 feet above high water.

Martino point, the north-east extreme of Lobos island, has rocks extending 3 cables from the shore to the north-eastward; from it Papagayo point, the south extreme of Lanzarote island, bears N.E. ¾ N., distant 4½ miles.

LIGHT.—A conical-shaped tower 21 feet in height, of a dark yellow colour and with a green lantern, stands on the summit of Cerro Martino, immediately below the point of the same name; it exhibits, at an elevation of 95 feet above high water, a *fixed red* light, visible over Bocayna strait between the bearings of E. by S. through south and west to N. by E., and in clear weather from a distance of 9 miles.

Anchorage.—Safe anchorage may be obtained during the north-east trade wind under shelter of Lobos island in 6 fathoms water, over sandy bottom, by bringing its south-east extreme to bear N.E. by N., and Gorda point, in line with the next point south-east of it, bearing N.W.

Port Cabras.—Midway between Lobos island and Lantailla point on the east side of Fuerteventura island, is situated an open bay, named port Cabras, the coast of which recedes about one mile; it has depths of from 12 to 20 fathoms, over sand and shells, and is the principal trading port in the island. The town has a population of about 450.†

The shores of this bay are clear of dangers, and the two peaks which form the southern termination of the plateau extending from mount Muda, afford good marks of recognition from the offing.

Tides.—It is high water, full and change at port Cabras at 1h. 0m.; springs rise 9 feet (approximate).

* See chart No. 886.

† See plan of port Cabras on Admiralty chart No. 886; scale, $m = 2$ inches.

Tidal streams.—The flood stream sets E.N.E. and ebb W.N.W.

Lantailla point, the south-east extreme of Fuerteventura island, lies 32 miles south-west from Lobos island ; it is the nearest part of the Canary archipelago to the African shore, from which it is distant 53 miles. From the point, cape Juby bears S.E. by E., distant 56 miles, and Morro Jable point, the south extreme of Jandia peninsula, W. $\frac{7}{8}$ S., 24 miles.*

Port Tarrajal.—From Lantailla point the coast is nearly straight for 15 miles in a W. $\frac{1}{4}$ N. direction to the sandy neck of Jandia peninsula ; 4 miles westward of the point there is a trading place named port Tarrajal, but the anchorage off it is not recommended.

Anchorage.—Commodore G. L. Atkinson, H.M.S. *Active*, Training Squadron, 1897, remarks :—"The south-east coast of Fuerteventura is the most sheltered spot, both from wind and swell, the latter being so troublesome ; there are no inhabitants, nor is there any sign of cultivation to the northward of Jandia point."

Morro Jable point, the south extreme of Jandia peninsula, is a low sandy point, from which Jandia point bears N.W. by W. $\frac{5}{8}$ W. distant $9\frac{3}{4}$ miles.

CAUTION.—Vessels passing Morro Jable point at night should not bring Jandia light to bear westward of N.W. $\frac{1}{2}$ W., nor get into soundings until the point is rounded.

Depths off shore.—On the east side of Fuerteventura island, abreast of Lobos island, the 100-fathoms line is 2 miles from the shore, and generally follows the coast at that distance for 16 miles to the southward, at 7 miles, however, approaching the coast to a distance of about half a mile.

Between Matoral bay and Fustes cove it is again that distance from the land, but from this it gradually increases its distance to Lantailla point, 4 miles off which, in a south-east direction, the depth is 50 fathoms ; proceeding westward from Lantailla point, the 100-fathoms line approaches to $1\frac{1}{2}$ miles from the shore at the commencement of the sandy neck, whence until near Morro Jable point, that distance is maintained.

Morro Jable point is "steep-to," the edge of the bank being only one mile off shore, whence to Jandia point it follows the coast at that distance, with regular soundings over it to within 3 cables of the shore, where the depth is about 10 fathoms.

LANZAROTE ISLAND lies north-east of Fuerteventura, from which island it is separated by Bocayna strait. The island is 32 miles in length in an E.N.E. and W.S.W. direction, its greatest breadth in a

* See chart No. 1,850.

northerly direction from Arrecife is 10 miles, and it has an area of 380 square miles. The soil, of volcanic earth, is fertile and well cultivated; quantities of early vegetables are exported.

The north side of the island, for a distance of 7 miles west of Farion point, is composed of perpendicular cliffs terminating at one mile from the coast in Monte Famara, the highest mountain in the island, 2,244 feet above high water, whence a sandy desert, 10 miles in length and 3 miles broad, extends to the volcanic peaks which occupy the remainder of the island.*

The wine of Lanzarote is sometimes considered superior to that of the other islands of the group. The population was estimated at 16,500 in 1895.

Coast.—The west side of the island is principally high and cliffy; the coast on the east side is much lower.

Pechiguera point, the south-west extreme of Lanzarote island, is a cliffy point with a few rocks at its base, and one mile north-east of the point is situated mount Roja, a conspicuous hill 680 feet above high water, which, from a distance, appears like an island. From the point, Papagayo point bears S.E. by E. $\frac{3}{4}$ E. distant $4\frac{1}{2}$ miles; the intermediate coast is rocky and recedes about a mile, forming the northern shore of Bocayna strait.

LIGHT.—On Pechiguera point, a conical-shaped lighthouse, 31 feet in height, with the tower painted grey and lantern green, exhibits, at an elevation of 51 feet above high water, a *fixed white* light, which, in clear weather, should be seen for a distance of 12 miles, over an arc of 223° .

Papagayo point, the south extreme of Lanzarote island, is a comparatively low red bluff, with shoals extending a short distance from its south extremity.

Penedo bay, on the north-west coast of Lanzarote, situated 5 miles south-west of the north extreme of the island, is a deep indentation completely exposed to N.W. winds.

Farion point, the north extreme of Lanzarote island, is low and rocky, projecting nearly half a mile from the base of the cliffs under Monte Corona, which is 1,940 feet above high water, and the northern extinct volcano on the island. The point should not be approached nearer than one cable.

At the extremity of Farion point there are two remarkable pinnacle rocks.

Orsola reef.—The north-east extreme of Lanzarote island, between Farion and Mojon Blanco points, a distance of $3\frac{1}{2}$ miles, is foul; and

* See Admiralty chart :—Lanzarote island, No. 1,852; scale, $m = 0.5$ inch.

midway, extending a distance of 4 cables from the shore, lies Orsola reef, with 3 fathoms water, a short distance outside it.

Coast.—From Mojon Blanco point, the coast trends S.S.W. in a direct line for a distance of 3 miles to Mugeris point, a mile north of which is situated a low white projection known as Usaje point.

Arrieta bay, situated between Mugeris and Pasito points, has at its head the village of Arrieta, to the southward of which temporary anchorage may be obtained in from 11 to 15 fathoms water, at about three-quarters of a mile from the shore; it is, however, completely exposed to easterly winds.

Coast.—From Pasito point the coast, fringed by rocks, extends in a south-west direction for 4 miles, and then more westerly for 5 miles to port Naos.

Port Naos.—On the east side of Lanzarote, midway between its extremities, is situated port Naos, the only harbour in the island; it is small, but secure, being formed by Cruces island and some rocky islets. It has two entrances, of which Boca del Perejil the southern, between Cruces and Francés islands, is the principal, having in it a depth reported to be 11 feet at low water.*

San José castle, a massive circular fort on the mainland opposite the northern end of Cruces island, is a prominent object and useful as a seamark.

The northern entrance to the port appears to have also about 11 feet at low water. The depths in port Naos between Cruces Island, and the mainland, range from 11 to 19 feet over white sand and mud, after passing the entrance; but the port is small, being only about a cable in width.

The town of Arrecife lies about half a mile west of the anchorage.

LIGHTS.—West of Cruces island in port Naos, two leading lights are shown from light structures, each consisting of a column, 20 feet in height and painted white, on which is a watch tower painted green and surmounted by an iron pole for the lantern.

The lower is a *fixed white* light, 50 yards from the shore, 35 feet above high water, and should be visible, in clear weather, from a distance of 6 miles.

The upper, a *fixed red* light, 47 feet above high water, is situated N.W. by N., distant 122 yards from the lower light, and should be visible from a distance of 7 miles in clear weather.

Communication.—There is telegraphic communication with Europe, Grand Canary, Cape Verde islands, and the west coast of Africa.

See chart No. 1,852.

* See plan :—Port Naos, on Admiralty chart No. 886; scale, $m = 2$ inches.

Coal and supplies.—A French steamship company, whose vessels call at Lanzarote, have a coal store on Cruces island.

Supplies are not plentiful at Lanzarote, that of water depends entirely on the rains, and at times there is a drought.

Anchorage.—Large vessels anchor off port Naos in depths of from 18 to 21 fathoms, on the parallel of the three windmills situated on a height close eastward of the town.

H.M.S. *Espiegle* (1881) anchored half a mile outside the entrance, in $16\frac{1}{2}$ fathoms water, with San Gabriel castle bearing W. $\frac{1}{4}$ S., port Naos south-east light W.N.W., right extreme Cruces island N.W. $\frac{1}{4}$ N.; the bottom is apparently coral as a lead fouled and was lost. This berth was found convenient for receiving coal in lighters from the coal stores which are situated on the northern end of Cruces island.

Directions.—The light structures by day and lights in line at night, bearing N.W. by N., lead through the south entrance to port Naos, but the channel is narrow, and should not be taken by a stranger without a pilot.

West of San José castle are two beacons, which in line, bearing N.W. $\frac{5}{8}$ W., lead in through the Boca de St. José, the northern entrance to port Naos.

Tides.—It is high water, full and change, in port Naos at 1h.; springs rise about 8 feet.

Port Arrecife.—Southward of the town of Arrecife, which has a large church near its centre, there is a small sheltered space protected by Quemado islet, the latter partly covered at high water; it is however only available for very small coasting vessels.

Large vessels anchor, in from 17 to 30 fathoms water, in the roadstead south of Quemado islet; this anchorage is completely exposed to southerly winds.

Submarine Telegraph Cable.—A telegraph cable is landed in a sandy cove about $1\frac{1}{4}$ miles south of the town of Arrecife; the cable house is a small wooden building, whitewashed.

COAST.—From port Arrecife the coast trends in a westerly direction for 6 miles, and then forms a bight, the western portion of which is known as Avila bay, where temporary anchorage may be obtained in from 7 to 16 fathoms water.*

At the eastern part of this bight is situated the village of Tiñosa and a reef, known by the same name, lies near the shore about a mile eastward of the village.

From Gorda point, the west point of Avila bay, to Papagayo point, the coast is clean and tolerably straight.

See chart No. 886.

* *See chart No. 1,852.*

East rock.—At 6 miles off the north-east extreme of Lanzarote island there is a small barren islet named East rock, with a craggy summit and deep water all around except on its south-east side, where rocks extend off some little distance; the 100-fathoms line approaches within $1\frac{1}{2}$ miles of the south-east side of East rock. From the rock, Farion point bears W. $\frac{1}{8}$ N. distant $7\frac{1}{2}$ miles, and Delgada point lighthouse (Allegranza island) N.N.W. $\frac{5}{8}$ W. distant 11 miles.

Rio strait.—The passage between Graciosa and Lanzarote islands is 4 miles in length, in a north-east and south-west direction. In the narrowest part, between the salt works on Lanzarote and the shore of Graciosa, the breadth is half a mile, and the depth in mid-channel $4\frac{1}{2}$ fathoms; to the eastward, the soundings deepen to 14 and 19 fathoms between Farion and Pedrobarba points, the eastern entrance points of the strait; but to the westward the north shore should be kept on board to avoid shoals of 3 and $2\frac{3}{4}$ fathoms, until Monte Famara is open west of Ginata point bearing S. by W. $\frac{1}{2}$ W.*

Anchorage.—Secure anchorage for large vessels may be obtained in various parts of Rio strait dependent upon the direction of the wind; the island of Graciosa giving protection from North and N.N.E. winds, while with S.E. winds, shelter may be obtained under the shore of Lanzarote; the bottom generally consists of sand with coral and large stones, and, if making any stay, it would be advisable to moor to avoid a foul anchor, but there is no good water nor supplies of any kind except fish, which may be purchased in abundance.

Tidal streams.—The flood stream runs to E.N.E. and ebb stream in a contrary direction, the rate, at spring tides, being about one knot an hour.

GRACIOSA ISLAND, lying off the north extreme of Lanzarote and separated from it by Rio strait, is $4\frac{3}{4}$ miles long in an E.N.E. and W.S.W. direction and 2 miles wide, its summit being 873 feet above high water.

Coast.—The shores of the island are of moderate height, and generally fringed with rocks for a short distance. About $2\frac{1}{4}$ miles south-west of Pedrobarba point, the east extreme of the island, there are buildings supposed to be intended for barracks; here there is a flagstaff and pier.

Montaña Clara island, forming the north extreme of the Lanzarote group, lies one mile northward of Graciosa island, with a clear channel with depths of from 10 to 12 fathoms between. The island is about 2 miles in circuit, its north extreme is clifty and bold, the south-west extremity low and shelving, with foul ground extending 2 cables from it.

* See plan :—Rio strait, on Admiralty chart, No. 886; scale, $m = 2$ inches.

Infierno or West rock, half a mile north east of Montaña Clara, and nearly connected with it by rocks, is the summit of a volcanic mountain, 20 feet above high water, and has foul ground to the westward of it for a distance of half a mile.

ALLEGRANZA ISLAND, the northern of the Canary group, is the remains of an extinct volcano, 940 feet above high water, nearly round, 6 miles in circuit, and separated from Montaña Clara island by a clear channel 4 miles wide, with an average depth of 35 fathoms.*

With the exception of the lighthouse keepers, Allegranza island is uninhabited, and only occasionally visited by the inhabitants of Lanzarote for the purpose of collecting orchilla.

Trabuco point, the south extreme of Allegranza island, bears from Infierno rock N.N.E. $\frac{3}{4}$ E. distant $4\frac{1}{2}$ miles.

The west side of the island is composed of precipitous cliffs 700 feet above high water and "steep-to"; the remainder of the coast is lower and fronted by rocks.

Landing place.—The best landing place is in a cavern on the south side of the island.

LIGHT.—The lighthouse on Delgada point, on the east side of Allegranza island, is a conical-shaped tower 49 feet in height, painted dark grey with a white lantern, and has a dwelling adjoining. It stands about 240 yards within the extremity of the point, and exhibits, at an elevation of 57 feet above high water, a *revolving white* light, with a period of revolution of *half a minute*, which, in clear weather, should be seen from a distance of 13 miles. The light is visible over an arc of 270° , or when bearing from S.S.E. $\frac{3}{8}$ E., through west and north, to N.E. by E. $\frac{5}{8}$ E. In 1897 this light was reported to show flashes varying from *two to six seconds*, and eclipses from *fourteen to twenty seconds*.

Depths off shore.—On the west side of Allegranza island the bank of soundings to the 100-fathoms line extends only three-quarters of a mile, and about 2 miles in a westerly direction from Montaña Clara.

On the north side of Allegranza island there is a depth of 30 fathoms at one mile from the shore, while to the eastward, on the parallel of Delgada lighthouse, there are 50 fathoms at 2 miles, the depth increasing gradually to 108 fathoms at 10 miles from the island, whence to the south-westward the 100-fathoms line is found at $1\frac{1}{2}$ miles south-east of East rock.

It approaches the shore of Lanzarote island to within about a quarter of a mile off Pasito point and gradually increases to 4 cables at 5 miles north of port Naos; and is 3 miles in a southerly direction from port Arrecife; off Papagayo point it approaches the coast to a distance of 2 miles.

See chart No. 886.

* See chart No. 1,852.

Conception bank, lying E.N.E., distant 49 miles from Allegranza, has depths of 98 fathoms over it, and is about 5 miles in length in a north and south direction with a general breadth of about $1\frac{1}{2}$ miles within the 100-fathoms line.

It lies towards the west extreme of what may be termed a sub-marine table land, depths under 200 fathoms extending from it for a distance of 13 miles in an east-north-east direction, and the specimens of the bottom, brought up by telegraph cable, were varied and curious. Patches of sand, hard rock, a kind of sandstone, and a red-ochry deposit, probably decomposed volcanic debris; fine, fragile, pinkish coral, and a large and perfect specimen of silicious sponge were found adhering to the cable; also anemones, minute starfish and barnacles.

At its western edge the bank slopes very abruptly, there being only a distance of $\frac{9}{10}$ mile between depths of 479 and 1,046 fathoms, but at its south-west edge it is more gradual, while at the north-east extremity the distance between 300 and 700 fathoms is $\frac{9}{10}$ mile.

* See chart No. 1,229.

CHAPTER VI.

CAPE BOJADOR TO RIVER GAMBIA.

 VARIATION IN 1900.

Cape Bojador - $17^{\circ} 55' \text{ W.}$ | Cape Verde - $19^{\circ} 15' \text{ W.}$
 Gambia River - - $19^{\circ} 15' \text{ W.}$

Decreasing about $1'$ annually.

CAPE BOJADOR.—When seen from the northward cape Bojador shows a strand of red sand, and has a gradual descent towards the sea, its western extremity, which is very low, forms a small bay with the cliff which adjoins; the eastern part of this cliff, about 70 feet above high water, is the most remarkable. The surf is exceedingly heavy all along this coast, but there is a small recess in the shore east of the cape, in which there is a depth of 9 fathoms, with smooth water. The west extreme of the cape is in latitude $26^{\circ} 7' \text{ N.}$ and longitude $14^{\circ} 30' \text{ W.}^*$

About 4 miles to the southward of cape Bojador, where the cliff terminates, there is a triangular patch of white sand, known as El Rincon, which forms a mark when seen from a distance.

H.M.S. *Sylvia*, Commander Dawson, anchored in $12\frac{1}{2}$ fathoms water, half a mile W.N.W. from the cape, in April 1886. No inhabitants were seen, the shore presenting an appearance of continuous sand hills and table lands sparsely covered with small bush and creepers.

Umona shoal.—The ss. *Umona* reports having struck, in 1899, on a rocky shoal from which cape Bojador bore S. $\frac{1}{2}$ E., distant $2\frac{1}{2}$ miles. Depths of 11 and 12 fathoms sandy bottom were obtained just after striking.

Tides.—It is high water, full and change, at cape Bojador at 0h. 0m.; springs rise about 8 feet.

Coast.—From cape Bojador the coast trends about S.W. $\frac{3}{4}$ S. for a distance of 62 miles, to a remarkable cliff, of a dark, greyish tint, named Peña Grandé, which, being 492 feet above high water, so far exceeds that of any other portion of this coast, that it serves as a good landmark. The general character of the shore thus far is alternate cliffs and sandy beaches, the former being the most extensive, and from 150 to 200 feet in height,

* See Admiralty chart :—Cape Ghir to Garnet head including the Canary islands, No. 1,229; scale, $m = 0.07$ inch.

with flat summits. The country in the interior has a dark appearance, though brushwood seems to be scarce.*

Water.—On this stretch of coast water might be procured at Los Dientes, 43 miles from cape Bojador, also at Peña Grandé.

Maluine bank lies about half a mile from the shore, 19 miles south of cape Bojador, and north of the anchorage of Pilones or Bumbalda, and is rocky with a least depth of 6 feet over it; at low water the sea sometimes breaks on the shoalest part of the bank, and between it and the shore there are depths of from 10 to 13 feet.

Pilones anchorage, off the open coast, is in from 9 to 10 fathoms water over sandy bottom, south of Maluine bank, and abreast of a sand-beach which is intersected by three small streams. The cliffs of Bumbalda commence close to the southern stream.

Depths off shore.—On the parallel of cape Bojador the 100-fathoms line of soundings is found 25 miles off shore; in lat. 25° N., the bank extends farther out, and the 100-fathoms limit is found 77 miles from the land. The nature of the bottom is sand and broken shells over a hard sandstone. The depth decreases gradually to 2 miles from the beach, where bottom cannot be found at 22 fathoms; at a mile from the foot of Peña Grandé cliff there are 26 fathoms, gravel and broken shells; and it is everywhere safe to approach and clean up to the beach.

Garnet head, in lat. $24^{\circ} 55'$ N., and 14 miles south-west from Peña Grandé, is a projecting point, fringed with some rocks, and having an overhanging cliff above it.

Garnet bay.—Immediately to the southward of Garnet head the coast, still cliffy, recedes and forms Garnet bay, also known as Angra de los Ruiros; fish are abundant.

In the southern part of the bay there is a deep valley named Buon Jardino, which leads to a settlement of Moors, where, it is stated, water may be procured, and there is land under cultivation. The southern point of the bay is a high, black, cliff, named by the fishermen point del Pulpito.

Anchorage.—The anchorage in Garnet bay, close under the head, is sheltered from winds from N.N.E., through east, to S.S.E., and the bottom of mud and sand appears to afford good holding ground; the depths are 16 fathoms at about half a mile, and 12 to 13 fathoms at 4 cables from the shore.

H.M.S. *Leven* found clean anchorage in 15 fathoms water, off Leven head, 25 miles south-west of Garnet head.

COAST.—From Garnet bay the coast continues in high cliffs, so far as seven capes, then an almost straight line of low cliffs, 35 miles in

* See Admiralty chart:—Garnet head to cape Verde, No. 1,230; scale, $m = 0.068$ inch.

length, extends from Leven head to Elbow point (Punta Cavalho), with a depth of 11 to 14 fathoms at 5 miles from the shore; this part of the coast is seldom visited by the fishermen, owing to the bottom generally consisting of broken shells.

In lat. 24° N. there is a break in the cliffs caused by a white sandy beach about 3 miles in length, and, about 6 miles south of this beach, an irregular mount apparently of rock and sand will be seen on the shore. At Angra de Caballo, a lofty cape with an overhanging bill, the aspect of the coast changes and all uniformity ceases, the cliffs giving place to a sloping sandy plain covered with sand hills, mostly conical in shape, sometimes in connected lines, and often isolated.

Anchorage.—There is indifferent anchorage off Angra de Caballo, in from $3\frac{1}{2}$ to 4 fathoms water, over gravel, but the sea is always breaking on this coast.

Deception cliff, so named from its having the appearance of an island from a distance, is approximately in lat. $23^{\circ} 56' \text{ N.}$; it is an enormous spherical shaped block of sand and agglomerated rocks, lying on the sandy shore, and forms a good point of departure; the shore is fronted by a continuous line of breakers.

Durnford point.—From Deception cliff, a long, narrow, peninsula extends in a south-west direction, for about 20 miles, to Durnford point. With the exception of two small hills it is level and bare, with an average height of about 30 feet, but lowering as Durnford point is neared; this point has some low black rocks above water extending from it.

OURO RIVER.—The large bay forming the estuary of the river Ouro, is contained between the peninsula above mentioned and the mainland, and immediately southward of Deception cliff, the basin at the mouth of the river can be seen over the low isthmus from aloft, as well as over part of the peninsula which separates it from the sea; at one or two places it may be seen from the deck.*

The general uniformity of the coast makes it exceedingly difficult when approaching the estuary of this river to ascertain the vessel's position by the appearance of the land. The soundings laid down on the Admiralty coast chart, as also the plan of the inlet or estuary inside the bar, are good guides; and there does not appear to be any alteration of importance since the partial survey in May 1821, by H.M.S. *Leven*, which vessel crossed the bar, and anchored about 7 miles within it.

Although the entrance to the river is 4 miles wide, it is nearly blocked by a sand-bank, which extends from the mainland, and by several rocky dangers with not more than 10 feet water upon them. The navigable part of the

See chart No. 1,230.

* See plan of river Ouro; scale, $m = 0.4$ inch, on Admiralty chart No. 1,230.

channel is about half a mile wide, and lies on the northern side of the entrance.

The Spanish settlement near Mudge head, about 5 miles from the bar, consists of a square enclosure of masonry, between 6 and 7 feet in height, and flanked at its north-west and south-east angles by a block house, the north-west, a two-storey building used for the garrison, is surmounted by a sentry box and flagstaff. The peninsula is uninhabited, the Moors only coming there to trade with the fort, and that under its guns.

The Canary fishermen state that the wandering Moors, who belong to the tribe of Wadilims, rarely come to the extremity of the peninsula, but are found near its junction with the mainland. According to some authorities these Moors are of a barbarous disposition; the fishermen, however, describe them as "tame."

The estuary abounds in fish, which can easily be taken in the seine, and winged and other game are to be seen in large numbers on the peninsula. The country is one almost unbroken series of undulating sands over which a few shrubs are dotted.

The estuary of the Ouro is a splendid sheet of tranquil water in the prevailing N.E. wind, and from the bar presents the appearance of a sea with high bluffs on the eastern side, and a low sand island (the peninsula) with occasional bluffs of moderate height on the western.

Communication.—A monthly schooner to the Canary islands, and steamers from Barcelona, bound to Fernando Po, call about every four months.

Supplies of all kinds, including water, are brought from the Canary islands; the garrison is relieved every three months.

Landing.—There is a landing-place close to the northward of the sandy spit, in a cove which, although a heavy surf rolls across its entrance, affords good shelter to boats. It may also be effected at a small jetty of stones, north of the fort, but it is difficult at low water.

Herne island, about 65 feet high, is a block of the same character as Deception cliff, and situated near the north extremity of this extensive basin; it lies 18 miles N.E. by E. from the bar, and is surrounded by banks which dry at low water, which seem to be connected with the banks at the mouth of the river Ouro at the head of the estuary, which, apparently disappears altogether at certain seasons.

The continuation of this singular opening has not yet been ascertained: scarcely any stream, however, was perceived to issue from its mouth, which was more than a mile wide.

Least water.—The bar had, in 1881, only 12 feet on it at low water spring tides, but it is since stated that a depth of 16 feet may be obtained;

it is composed of sand and situated about $1\frac{3}{4}$ miles east of Durnford point and about two-thirds of a mile south of a long sandy spit projecting to the eastward from the peninsula; after crossing the bar the channel rapidly increases in depth, and expands into a fine basin with a clean bottom, about 2 miles across from bank to bank, and 7 or 8 miles in length, before it again shallows.

The water on the western side (that of the peninsula) shoals very gradually, and at many points landing from a boat would be difficult. The surrounding land presented no objects from which a leading mark for the bar could be obtained; and it would not be safe for any vessel to attempt the entrance without a pilot or previously buoying it.

Anchorage.—In anchoring near Durnford point it will be advisable not to approach the south-west corner of the peninsula within 6 cables, as a shoal with depths of from 9 to 15 feet over it extends south-westward of the point. All along the southern end of the peninsula the water is shoal for distances of 3 or 4 cables, the deepening being very gradual. There are breakers in rough weather, 2 miles S. by W. of the point.

Good anchoring ground, in 6 or 7 fathoms water, somewhat less than a mile from the extremity of the peninsula, can be reached by coming in on an easterly course which will lead clear of doubtful spots. This anchorage, in the prevailing N.E. wind, has smooth water, and is frequented by fishing schooners from the Canary islands, which vessels also anchor in soundings out of sight of land south of the Ouro.

To anchor off between Durnford point and the spit, bring the former to bear N. by W. and Spit point E. by N., and anchor in about 5 fathoms water. A sand bank, on which the depth is 5 feet at low water, lies about half a mile south-east of this anchorage. The spit can generally be traced by the broken water, and also the edge of the sunken reef, but caution is necessary, as a strong current runs to the eastward on the flood.*

The full influence of the tidal stream is felt as far out as Durnford point; this should be remembered in making for the outer anchorage near that point.

The inner anchorage recommended is in $5\frac{1}{2}$ fathoms water, over sand, at about three-quarters of a mile from the shore with the fort bearing N.W. by W. $\frac{1}{2}$ W. This anchorage, even with S.W. winds, may be considered secure and the holding ground good, but the tidal streams run strongly.

Directions.—It may be well for a vessel proceeding to the Ouro to keep on the line of soundings marked on the chart. Deception cliff is a good mark for vessels when at no great distance from the land, in clear

See chart No. 1,230.

* Commander L. S. Dawson, H.M.S. *Sylvia*, 1886.

weather Trevor point, which shows black against the cliffs, may be seen, but Herne island is not visible from the entrance of the estuary.

From the outer anchorage the course is about W. by S. towards Trevor point, and the depths should decrease from $5\frac{1}{2}$ to $3\frac{1}{4}$ fathoms if the vessel is not too near the point of the spit. When on the bar, Durnford point should be completely open of the spit, and the least depth, 16 feet, obtained, after which the water should deepen to $5\frac{1}{2}$ and 11 fathoms, and a N.E. $\frac{3}{4}$ E. course may be steered, but it would be prudent to sound and buoy the bar before entering. In fine weather the bar does not show except at changes of tide.

Tides.—It is high water, full and change, in Ouro river at 0h. 0m.; springs rise 8 or 9 feet.

Tidal streams.—Off the entrance the flood stream sets nearly east, and the ebb west, with a velocity of about $2\frac{1}{2}$ knots an hour. At the bar the young tide occasionally makes strong eddies, and inside the bar, the tidal stream runs at the rate of $2\frac{1}{2}$ knots an hour. Over the bar, and the shoals, it sets with great velocity, and causes a high break, which affords an unerring beacon to the shoalest portions. There appear to be three or four of these sandy bars or ridges, thrown up by the action of the tidal streams; they extend nearly to Fisherman point, distant 8 miles S. $\frac{3}{4}$ W. from Durnford point.

Angra de Cintra bay.—From Trevor point the cliffs gradually become lower to Fisherman point from which the coast trends south-west for 26 miles to latitude $23^{\circ} 7' N.$; the northern 13 miles being cliffs, along the base of which, to the distance of 3 or 4 miles from the shore, extends a bank with a depth of 5 fathoms on its outer edge, and 12 fathoms close to it.

From the summit of the cliffs, white sandy downs, with flat summits, extend inland, one of which at the distance of 8 or 9 miles from the southern termination of the cliffs, appearing somewhat elevated above the rest, and having its southern extremity peaked, is remarkable; it is situated at a short distance from the beach in the bay of Angra de Cintra.*

From the north entrance point of this bay a reef extends southward for 3 miles, the point itself being low and sandy, is almost level with the water. The south entrance point of the bay is in latitude $22^{\circ} 58' N.$, and from it also a reef projects a considerable distance to the north-east. The break in the coast between these reefs, which forms the opening into the bay, is about 7 miles wide; and from the northern reef, the bay extends about 4 miles in a N.N.E. direction.

Midway between the two reefs at the entrance there is only a depth of $4\frac{1}{2}$ fathoms, over sandy bottom; and a little further to the south-east of

See chart No. 1,230.

* See view A. on chart No. 1,230.

this position there is a detached shoal. The opening seems otherwise safe, there being 7, 8, and 9 fathoms water in the rest of the space. Great care is necessary when entering the bay, which is known to the Spanish fishermen as Gulpho. The bay is apparently shallow, but abounds with fish, as does the whole bank between the river Ouro and this bay.

Water.—It is stated that at the foot of the high down, above mentioned, good water may be obtained by digging in the sand.

Fishery.—Fishing vessels belonging to the Canary islands are found in this vicinity; they salt and cure fish for the supply of those islands.

Rollers.—During the time of rollers, the sea breaks very heavily along this part of the coast, and in winter it breaks in several places across the opening into Angra de Cintra bay.

Cintra hills.—About 10 miles southward of Angra de Cintra bay, and a few miles inland, there are three or four small isolated sandy downs, about 500 feet in height, named Cintra hills; they are rather higher than the adjacent ground, and may serve as a mark by which to find the bay, but cannot be seen from distances of more than 10 or 15 miles.

St. Cyprian bay.—From Angra de Cintra bay, the coast, low near the shore, but gradually rising and becoming a continuous plain of white sand, trends S.W. by S. for a distance of 21 miles; it then turns S.W. by W. for 17 miles, presenting alternately cliffs and sandy beaches so far as St. Cyprian bay.

The eastern point of this bay is a cliff 150 feet above high water, with a circular form towards the sea, and a flat summit somewhat resembling a fortification. The western side is also a steep cliff, which, after extending $2\frac{1}{2}$ miles to the westward, turns abruptly to the southwestward, and forms cape Barbas, at a distance of 55 miles, S. W. $\frac{1}{2}$ W., from the north entrance point of Angra de Cintra bay.

Unsafe anchorage.—Baron de Roussin, who named St. Cyprian bay the bay of Tribulation, from the danger to which his vessels were exposed during the five days they were occupied in its examination, observes that being open from N.E. to W.N.W., it affords no shelter from the prevailing winds and the heavy swell that they roll in; and the anchorage, though on a bottom of sand and mud in from 10 to 20 fathoms water; offers very little security, therefore vessels should never enter the bay except in cases of absolute necessity.

The multitude of fish found here attracts the Canary fishermen, who, with the hope of being quickly laden and the appearance of moderate weather, frequently anchor too close in, where, if the wind suddenly freshens, they are equally incapable of beating out of the bay with their crazy vessels, or of riding out the gale with their ill-found ground tackle.

Should the anchors drag and the vessels be thrown upon the beach, the crews are sure of being plundered, stripped, and made slaves by the Moors, which latter appear to be mere wanderers of the desert, outcasts from the other tribes, and to have no fixed habitation; they are probably scattered along the coast from cape Bojador to Senegal river.

Anchorage.—H.M.S. *Leven* anchored off cape Barbas in 19 fathoms water, over fine green sand, the cape bearing S.S.W., distant 4 miles.*

Depths off shore.—On the parallel of 24° N. the 100-fathoms limit is about 60 miles from the shore, the depth gradually diminishing as the land is neared; between 20 and 22 fathoms are the depths generally found at 20 miles, and 14 to 16 fathoms at 4 miles from the coast. Fine sand, with broken shells, is the prevailing nature of the bottom, but the nearer the coast the fewer the shells, and sometimes the sand becomes muddy.

From the parallel of 24° to that of 23° N. latitude, the limit of the 100-fathoms approaches nearer to the coast, and on the parallel of Angra de Cintra bay it is distant about 50 miles off; here the edge is steeper and the soundings change rapidly from 100 to 45 or 50 fathoms; thence towards the land the decrease is gradual, and the depth of water between 2 and $2\frac{1}{2}$ miles off is from 10 to 15 fathoms. The character of the bottom is similar to that between the parallels of 25° and 24° .

Southward of the parallel of 23° N., between Angra de Cintra bay and cape Barbas, the bank again narrows, the 100-fathoms limit being only a little more than 30 miles off the cape, and the depth decreasing rapidly to the 50-fathoms line. The bottom is chiefly composed of sand and shells; the sand being grey in the offing and more mingled with shells, as the coast is approached.

COAST.—Galha point bears from cape Barbas S.W. by W. $\frac{1}{2}$ W., and is distant 9 miles; the coast between being an uninterrupted cliff of about 80 feet in height; there is a depth of 12 fathoms at a mile off shore, and at a distance of 2 miles there are 17 fathoms water, on a bottom of muddy sand and broken shells; the coast near Galha point is formed by the usual sandy plains of this coast, with the addition of a few cliffs; southward of the point it recedes and forms a shallow bay full of reefs, and having, off both its northern and southern entrance points, an outlying and dangerous rock.

Pedra de Galha rock, the northernmost of these rocks, lies about 2 miles W. by N. from Galha point; it is about 46 feet above high water, rather higher on the northern than on the southern side, and about half a mile in circumference.

See chart No. 1,230.

* See view B. on chart No. 1,230.

Virginie rock lies 2 miles off shore, and about 3 miles S.S.W. from Pedra de Galha rock, of which it is about three times the size. These rocks are in some measure connected by a chain of flats which extend a mile northward of Pedra de Galha, and half a mile southward of Virginie rock. At a mile westward of these rocks, a depth of 18 fathoms will be found on muddy sand; and as the depth increases to the southward, the bottom becomes harder.

Shoal.—The ss. *Chili* (1899), drawing 24 feet water, struck on a shoal situated about 6 miles S.W. $\frac{5}{8}$ S. from Virginie rock and about 3 miles from the mainland. Virginie rock should not be passed at less than 2 miles distant.

COAST.—From Virginie rock cape Corveiro bears S.S.W. $\frac{3}{4}$ W., distant 23 miles, and S.S.W. $\frac{1}{4}$ W. 57 miles further is situated the shoulder of cape Blanco. The intermediate coast is moderately high and nearly straight, with but few trifling indentations. So far as cape Corveiro it is one continued stretch of white sand, rising in some places into peaked hills, in others gently sloping to the sea, with here and there a few cliffs, and the whole without the least appearance of vegetation.*

Cape Corveiro.—There is a white sandy beach 5 or 6 miles long, at the head of a slight indentation named St. Ann bay, on the north side of which there is a black rocky point surmounted by a low cliff, and on its south side the irregular summit of one of the cliffs, before mentioned, forms a striking contrast with the uniform smoothness of the adjoining coast. It is about 5 miles in length, and its most salient point, though not very well defined, is named cape Corveiro, the latitude of which is $21^{\circ} 47' N.$ A muddy bottom is found near the cape.†

Shoal.—In the centre of St. Ann bay, about one mile off shore, a shoal is stated to lie; the sea breaks heavily on it.

Coast.—Southward of cape Corveiro the coast consists of white and red sandy slopes, assuming various shapes, alternately terminating at the water's edge in broken cliffs, or in low sandy beaches, on which there is a heavy surf. In running along the coast, at 25 miles northward of cape Blanco, Levrier bay is seen over the isthmus which connects that cape with the mainland; and at 5 miles N. by W. $\frac{1}{4}$ W. from cape Blanco, there is a high sandy shoulder projecting from the line of coast, named False cape Blanco on account of its having often been mistaken for the cape itself.

CAPE BLANCO, in latitude $20^{\circ} 46' 27'' N.$ and longitude $17^{\circ} 2' 50'' W.$, is a perpendicular white cliff, 75 or 80 feet above high water, and composed of strata of calcareous grit of varying hardness; its surface is quite barren and flat with the exception of a small conical hill, resembling a sentry box.

See chart No. 1,230.

* The wreck of the French steam-vessel *Condé*, which, lying on a white sandy beach in lat. $22^{\circ} 1' N.$, formed a good mark, is stated (1899) to be disappearing.

† See view C. on chart No. 1,230.

The cape presents a sea front of about a quarter of a mile long, which lies nearly east and west, with a beach extending to the eastward of the cliff for a distance of a cable, the former being so steep that at 50 yards from it there are 7 fathoms water. From the western extreme of the cape, a shoal spit projects to the south-westward for a distance of about $1\frac{1}{2}$ cables, with 3 fathoms on its extremity, and two detached shoals of $3\frac{1}{2}$ and 4 fathoms lie $2\frac{1}{4}$ and 3 cables respectively S.S.W. of cape Blanco.*

Boundary.—Near False cape Blanco the Spaniards have erected a flagstaff to indicate the southern limit of the territory claimed by them on this part of the coast.

West bay is formed by cape Blanco and False cape Blanco, the sandy shoulder 5 miles N. by W. $\frac{1}{4}$ W. from it. The shore consists of a broad beach of white sand interspersed with cliffs; through one of these cliffs the sea has perforated a large hole, which may be seen at some distance, especially when approaching from the westward.

Anchorage.—The anchorage in West bay (as well as on the whole coast from cape Corveiro) is clean; a bottom of muddy sand is found throughout, with depths of from 12 to 19 fathoms at about a mile from the shore; and large vessels may proceed so far in as to be sheltered from a N.W. wind.

There is fair anchorage in West bay in $5\frac{1}{2}$ fathoms water, with a bluff about half a mile eastward of False cape Blanco, bearing N. by E.

In March 1886 H.M.S. *Sylvia* experienced in West bay strong winds from North to N.E., from 10 a.m. to midnight; until 10 a.m. it was from N.E. The wind was less by day than at night, increasing about sunset. There is less swell than in Levrier bay, abundance of fish to be taken by the hook, and little chance of losing an anchor; also should a strong westerly breeze set in, vessels have the option of going inside for shelter.

Landing may be effected here in comparatively smooth water, the reef extending from this bluff affording protection from the prevailing surf.

Levrier bay.—The long promontory of cape Blanco forms the western side of the extensive bay of Levrier, which is 24 miles long from north to south, and about 22 miles wide at the entrance. The anchorage ground in this bay is much restricted by an extensive bank and detached shoals, which extend from the eastern side.

The western side of Levrier bay is indented by Repose bay and a small shoal bay, situated 7 miles northward of it, known as Star bay; the head of the bay is named Archimedes bay.

The coast on the eastern side of Levrier bay is low, with a few sand-hills upon it; it is fronted by a shoal bank, which, to a depth of 3 fathoms,

* See Admiralty chart :—Levrier bay and cape Blanco (South), No. 1,699; scale, $m = 2\cdot0$ inches, and views on charts Nos. 1,230, 1,699.

extends generally about 3 miles from the coast, with numerous off-lying dangers, which, in the southern part of the bay, are found at 7 miles from the eastern shore.

Repose bay.—Cansado point, the south entrance point of Repose bay, is situated $4\frac{1}{2}$ miles N.N.E. $\frac{3}{4}$ E. from cape Blanco, and Rey point, its northern limit, is $3\frac{2}{3}$ miles further, in nearly the same direction. Shoal water extends about half a mile east of Cansado point, and between cape Blanco and Cansado point from 2 to $3\frac{1}{2}$ cables. The bay, which is about 2 miles deep, has $4\frac{1}{2}$ to 5 fathoms water in the centre shoaling towards the shore.

A spit extends for a distance of a mile in a south-west direction from Rey point; it has 14 feet near its extremity, and 6 feet at a distance of 8 cables south-west of Rey point, and on the south side of the bay another spit extends $1\frac{1}{4}$ miles in a northerly direction from Cansado point, having depths of from 2 to 3 fathoms over it.

Repose point, $1\frac{1}{2}$ miles westward of Rey point, forms the southern side of Samphire cove, which extends about half a mile, in an easterly direction, with a breadth of about 2 cables, and has a general depth of 9 feet.

Anchorage for small vessels may be obtained about 4 cables south of Repose point in a depth of 15 feet, but the bay affords very little shelter from N.E. winds, which blow here with great violence, and are loaded with minute sand, which is most injurious to the eyes. H.M.S. *Ætna* rode very uneasily in this bay, and parted one of her chain cables; even with a slight breeze there is a troublesome sea, and it did not appear that on the eastern side of cape Blanco there was any convenient anchorage.

Repose bay is sheltered from N.W. and N.N.W. winds should they blow, but the Canary fishermen who frequent this anchorage assert that N.N.E. and N.E. winds constantly prevail, and that those winds, and the sea therewith, are considerably heavier than is experienced when west of the cape, and therefore, though there is certainly anchorage in Levrier bay for vessels of any size, yet they are recommended to take up the outside anchorage in West bay, to which the Canary fishermen resort in preference to that found to the eastward of the cape.

Levrier bank, with $2\frac{1}{2}$ fathoms water on it, lies near the western extreme of a large bank, with depths under 5 fathoms, which stretches for about 5 miles in a north-east direction across the western side of the entrance to Levrier bay. The western extreme of the shallow part of the bank, with $2\frac{1}{2}$ fathoms water, is situated E. $\frac{7}{8}$ S. distant $1\frac{1}{2}$ miles from cape Blanco, but the channel, with depths of from 7 to 16 fathoms, between the steep beach of the cape and the 5-fathoms line of the bank is only about $4\frac{1}{2}$ cables in width.

Another narrow bank, with $2\frac{1}{2}$ fathoms water over it, is situated near the eastern extreme of the large bank before mentioned, the southern extreme bearing East, distant $4\frac{8}{10}$ miles, from cape Blanco.

Directions.—To make cape Blanco, run down the latitude of $20^{\circ} 52' N.$, on which parallel the shore may be approached to the depth of 15 fathoms in the thickest weather. When in that depth, the land should be visible and the surf be heard at a distance of $1\frac{1}{2}$ miles from the shore.

If the weather is very thick, it will be prudent to anchor; but should the cape be seen, steer so as to pass it at a mile distant, in order to avoid the long spit, with 3 fathoms water at its extremity, which extends to the south-westward. When the eastern angle of the cliff, the upper part of which overhangs like an open mouth, comes fairly in sight, haul in towards the steep sandy beach; it may be given a berth of about 2 cables, but be careful not to approach it so near as 7 fathoms water; the depth of 12 fathoms is a prudent distance.

Should the wind hang north-easterly, and a board to the eastward become necessary, tack in again as soon as there is sufficient room, and upon no consideration decrease the depth of water, in standing to the eastward, to 9 fathoms, as the next cast will probably be $2\frac{1}{2}$ fathoms.

With a foul wind it would be prudent to anchor outside, and wait until the flood tide has made, when a short board will carry a vessel to the anchorage.

The anchorage is an uneasy one; the best berth will be in 10 or 12 fathoms water, about three-quarters of a mile north-east of the cape, but no mud will be found south of Cansado point, off which an advantageous berth may be taken in a depth of 8 fathoms.

CAUTION.—The depths in Levrier bay have considerably changed, especially near cape St. Ann. Caution must be used in navigating this bay, and great attention should be paid to the use of the lead.

Working to windward.—To beat up to cape Blanco from the southward against the prevailing N.E. winds, Commander Belcher recommends standing off on the starboard tack during the flood, and in-shore with the ebb, because the ebb stream in the offing sets northerly, and when closing the land, will be rather on the lee-bow. Vessels should not, however, stand in after the last quarter ebb, unless it be the intention to drop an anchor, for with light winds a dull sailing vessel will not stem the tide and current.

Whenever cape Blanco can be brought to bear E.S.E., stand boldly in towards the land, but if bound to the inner anchorage, do not attempt to round the cape against an ebb tide, for unless the breeze be strong from the westward, few vessels could get beyond the steep sandy beach. It is better under such circumstances to anchor on the west side of the cape.

Bayadere banks lie off the pitch of cape Blanco; they were not minutely examined, but seemed to be extensive, and though the least water found on them was $4\frac{1}{2}$ fathoms, yet heavy overfalls were plainly seen during the ebb tide. The directions given above for rounding the cape leads well clear of them to the northward.

Tides.—It is high water, full and change at cape Blanco at 11h. 46m.; springs rise 6 feet; and in Levrier bay at 0h. 0m.; springs rise 6 to 7 feet.

Tidal streams.—The tidal streams about cape Blanco are irregular, and their direction is much influenced by the form of the land. At the *Ætna's* position between the cape and Levrier bank, the course of the flood stream was N.E. by N., and the ebb S.W. by S., with a velocity of $1\frac{1}{2}$ to $1\frac{3}{4}$ knots an hour. At 2 miles east of the vessel, the streams ran N.N.E. and S.S.W.; and at $1\frac{1}{2}$ miles southward of the cape the flood ran S.E., and the ebb W.S.W., at the rate of $2\frac{1}{2}$ knots an hour. Off the coast northward of the cape, the flood stream sets south, and the ebb north; and close inshore, the stream is considerably weaker than at 3 miles distant from the land.

Cape St. Ann.—Cape St. Ann, lying S.E. $\frac{3}{4}$ E. distant 22 miles from cape Blanco, is a low plateau about 26 feet above high-water, the land in the vicinity is marshy.

From cape St. Ann the coast extends 10 miles to the southward, and at that distance forms cape Arguin, which is the dividing point between Levrier bay and the deep bay in which is situated Arguin island; the land in the vicinity is low and appears to be formed of shifting sand hills.

Arguin island, formerly an important trading post, is the easternmost and largest of a group of islands occupying the middle of the bay east of cape Arguin, and is entirely surrounded by a bank of sand. It is composed of a kind of brown freestone in strata, the northern part being sloped, the southern sandy; the soil is exceedingly arid, but near the north end of the island there is a tree, about 25 feet high, and surrounded by bushes, which serves as a landmark. One of the tanks of the island has been cleared of sand and can supply water for about 100 men. A French company for curing fish, &c. built a large storehouse on the island, but it has been abandoned.*

* See plan of Arguin bay on Admiralty chart No. 1,230; scale, $m = 0\cdot8$ inch.

Least depth.—A channel, with a depth of 14 feet at low water in it, leads to the anchorage off the island of Arguin.

Beacons and buoys.—There is a beacon on Salines point; a pyramidal shaped beacon on cape Arguin; a beacon on Consuelo point and two beacons on the west side of Arguin island; two leading beacons on the mainland, about $2\frac{1}{2}$ miles east of Consuelo point, and a beacon, also on the mainland, $2\frac{1}{2}$ miles to the northward of the leading beacons; a beacon on the west side of Marguerite island.

There is a buoy, moored about half a cable west of cape Arguin, but in 1890, the beacons were gone, therefore no reliance should be placed on finding either beacons or buoys in position. *See Caution; buoyage, page 33.*

The anchorage is in 23 feet water, over sand and mud bottom, at a half to one mile eastward of the fort. The best time for entering is about 2 hours before high water.

Tides.—It is high water, full and change, in Arguin bay at Oh. Om.; springs rise 6 to 7 feet.

Depths off shore.—The depths vary from $2\frac{1}{2}$ fathoms to 6 fathoms at from 3 to 4 miles in the offing between Arguin island and Tider island.

Tidal streams.—The tidal streams are very strong at the entrance of Arguin bay, running from $2\frac{1}{2}$ to $3\frac{1}{2}$ knots at springs. The flood sets strongly on the S.E. bank, and the ebb on the central bank, which latter is the more dangerous on account of its rocky bottom.

Arguin bank.—The bank of Arguin may be described as a continuation of the broad shoal which occupies the eastern side of Levrier bay, and to extend from thence to the southward of cape Mirik, a distance of about 90 miles, its extreme breadth being about 40 miles, and its western elbow lying in long. $17^{\circ} 10' W$. The bottom on this bank is apparently a flat and very hard sand, but generally covered with broken shells.

No vessel can approach Arguin bank to a less depth than 7 fathoms without risk, as at a very short distance to the eastward of this there is shoal water. The general direction of the edge of the bank to the northward of lat. $20^{\circ} 0' N$. is S.W. by S., and to the southward of that parallel about S. by E. to cape Mirik. No part of the edge of the bank has been seen dry, but close to the breakers which occur, in many places, there are but a few feet of water, and the shoals between them do not appear to carry more than 10 feet.

Depths off shore.—In approaching from seaward, when to the northward of $20^{\circ} 0' N$., the soundings gradually decrease to the edge of the bank from about 30 miles to the westward, where 40 fathoms will be found. To the southward of this parallel the bottom becomes more uneven, and

See chart No. 1,230.

from the spot where *La Meduse* was wrecked, in $19^{\circ} 53' 42''$ N., and $17^{\circ} 1'$ W., a still greater irregularity takes place in the depth.*

The nature of the bottom westward of the bank of Arguin observes a remarkable law, which may be of some service to navigators who are obliged to approach it. From the 7-fathom edge of the bank, out to the depth of 25 fathoms, and thus including a belt of more than 15 miles in breadth, the lead invariably brings up a mixture of sand and broken shells, and in proportion to the proximity of the bank the shells prevail; beyond the depth of 25 fathoms and so far as that of 50 fathoms the bottom is entirely of white sand.

Hence it is evident that by the soundings, and by a rough observation for latitude, a vessel may always know her distance from Arguin bank. For example, should a vessel in latitude $20^{\circ} 20'$ N. find 23 fathoms with sand and broken shells, it may be safely inferred that the dangerous edge of the bank is not more than 22 miles to the eastward, and likewise that cape Blanco bears about N.E. by E. $\frac{1}{4}$ E., distant about 35 miles.

CAUTION.—To the northward of $20^{\circ} 20'$ N. this law is uniform, but to the southward of that parallel it is subject to some exceptions, and the best advice to give the seaman is to keep the lead going, and not to shoal the water to less than 25 fathoms; as the bank south of lat. 20° N. takes a direction of S. by E., it becomes no longer dangerous if a vessel is kept on a wind in 20 to 25 fathoms, and sounds frequently. In any case, however, the mariner is recommended to pay strict attention to frequent sounding, as it is indispensable while in the neighbourhood of this extensive and dangerous bank.

Commander Belcher seems to have some doubt of the strict uniformity of the remarkable and apparently useful law above quoted from M. de Roussin's work, but observes that, "Whether this remarkable distinction in the *quality* of the soundings be correct or not, the *depths* will be sure guides, and unless actually bound to cape Blanco no vessel has any business within 15 fathoms by day, and 25 by night, especially to the southward of $20^{\circ} 0'$ N. Vessels in the vicinity of this bank should frequently feel for the bottom with 40 or 50 fathoms of line."

The *Ætna*, standing in towards the bank near the place where *La Meduse* was wrecked, suddenly shoaled to 7 fathoms; and in standing off found the depth decrease to 5 fathoms, which continued for a quarter of an hour, then it deepened to 16, and as suddenly no bottom was found with 100 fathoms. The current and tide probably set strongly on the bank, as

See chart No. 1,230.

* On the 11th May 1889, Hon. Lieutenant J. W. Jennings, R.N.R., commanding the Royal Mail steamer *Doric*, reports that in latitude $18^{\circ} 57'$ N., and longitude $18^{\circ} 15'$ W., he sounded and got bottom at 56 fathoms, black sand. The bank from the colour of the water appeared to extend a long way to the N. and N.E.

subsequent experience proved they did, so that the vessel scarcely stemmed them, and thus accounted for the long detention in the depth of 5 fathoms.

Cape Mirik, bearing South, distant 89 miles, from cape Blanco, is a very low sandy point near the southern termination of the great bank of Arguin. The intermediate coast, between the low sandy point forming the eastern limit of Arguin bay and cape Mirik, has only been partially examined; it is everywhere fronted by shoals and sandbanks, which render all approach difficult.

At about 20 miles north of cape Mirik there is a group of islands near the shore, the most important of which is known as Tider island, lying 3 miles from the mainland, to which it is joined by sand-spits, extending from the north end; these uncover at low water.

St. John island is situated at the bottom of this gulf, of which cape Mirik forms the western extremity.

Tanit bay.—From cape Mirik the coast trends S.S.E. $\frac{3}{4}$ E. for a distance of 27 miles, where it forms a sudden bend, named Tanit bay. It is all low, and forms a continuous chain of small regular sandy downs, very white, and interspersed with small bushes.

A few huts are in some places seen near the beach, and in the dry season numerous parties of the vagrant tribe of Moors, before mentioned, assemble here to catch and dry fish. Two large sheets of water were observed between the high downs, but whether they were fresh or salt was not ascertained, from fear of collision with those barbarians.

Angel hillocks.—From Tanit bay the general direction of the coast is S. $\frac{1}{2}$ W. for a distance of 36 miles, to some flat sand-hills rather higher than the rest of the coast, known as Angel hillocks. They are divided into two groups; the northern, which is smaller than the others, is studded with tufts of brushwood, while the eight or nine hummocks of the other group are nearly bare. The southernmost and highest hillock is in lat. $18^{\circ} 29' N$. Southward of Angel hillocks the shore gradually becomes lower, till it sinks into an uniform line of sand scarcely above the level of the sea, with here and there a bush.*

CAUTION.—At about 14 miles south of Tanit bay a short bank commences which, with depths of from $1\frac{3}{4}$ to $2\frac{3}{4}$ fathoms, extends about 4 miles from the beach; this bank appears to extend about 7 miles to the southward, and no part of this coast from cape Mirik should be approached to a less depth than 8 fathoms; by attending to which rule all dangers will be avoided, and amongst others the Angel bank, a shoal flat

See chart No. 1,230.

* The wreck of a three-masted vessel which was lost towards the end of 1881, near Angel hillocks, was visible from seaward for 8 miles, and as the wreck will probably remain for some years, it will form an excellent landmark. The wreck lies in lat. $18^{\circ} 30' N$. approximate.

which extends 7 miles from the beach, abreast of Angel hillocks. This flat affords, however, a convenient anchorage for small vessels.

Landmark.—At 12 miles southward of Angel hillocks, and a little within, and higher than the beach, there is a stunted palm, the only one seen in the long interval of coast between cape Bojador and Senegal river.

Portendick.—About 2 miles southward of the above palm tree is the site of Portendick, one of the places to which, by the treaty of 1783 with France, the English gum trade was confined. The coast is a continuous line of sand, with a few hillocks, and some scattered bushes, but all so low that nothing can be seen even in the clearest weather at a greater distance than 9 miles.*

No vestige could be found of the former settlement, and the huts, which were hastily constructed by the Moors, consisted of loose bushes only, and were not more than 4 feet high; they answer, however, the temporary purposes of the traders who bring down gum, or of the fishermen who find here an abundant harvest.

Roadstead.—The roadstead is west of a small projection of the beach, and between two banks of sand and shells, one mile apart, both lying in a N.N.W. and S.S.E. direction, and having from $1\frac{3}{4}$ to $2\frac{3}{4}$ fathoms water on them.

North shoal, the inner bank, is 2 miles long, its south extreme bearing S.W., distant 3 cables from the point near the landing-place, where the Moors generally erect their huts, and there is a knoll with a depth of 10 feet, one cable W. by N. from the same point, with $3\frac{1}{2}$ fathoms water inside it. The northern extreme of this bank is reported to be situated considerably farther to the northward than is shown on the Admiralty chart.

About $1\frac{1}{4}$ miles W. by S. from the landing-place, on the projecting point of beach, lies the north extreme of South shoal, or the outer bank, which extends from thence S.S.E. for about one mile; in a north-north-west direction from this bank there are several patches of $2\frac{3}{4}$ fathoms.

Anchorage.—Anchorage may be obtained, in $4\frac{1}{2}$ or 5 fathoms water, at 4 miles from the beach, with the Angel hillocks bearing N.E. by E.; this is a good place at which to anchor, if intending to communicate with the natives. (See foot-note, page 207.)

The depths in the roadstead are from 4 to 5 fathoms, over sand and shells, and vessels may anchor where most convenient, according to circumstances; vessels taking in cargo can anchor, in about 4 fathoms water, at about half a mile S.S.W. from the huts, and 2 cables southward of the northern bank. H.M.S. *Britomart* anchored in 5 fathoms water, $1\frac{1}{4}$ miles, W. by N., from the landing-place.

* See plan Portendick anchorage on Admiralty chart No. 1,230; scale, $m = 0.75$ inch.

Directions.—The stunted palm not being visible at a greater distance than $1\frac{1}{2}$ or 2 miles, vessels proceeding to Portendick from the northward should make the Angel hillocks, and then run along shore in a depth of about 6 fathoms, paying careful attention to the lead.

If not sure of the latitude, a vessel, wishing to make Portendick, should anchor in a depth of 6 fathoms.*

The palm tree, which is old, should be made out before the bank is neared too closely.

There is a bush, rather higher than the rest of the coast, at the head of the little bay where the anchorage is, which might catch the eye when approaching; when steering for this bush, bearing S.E. by E. $\frac{1}{2}$ E., there is not less than $4\frac{1}{2}$ fathoms water, until within $1\frac{1}{2}$ cables of the shore.

The coast is so low about Portendick that it cannot be distinguished when in 7 fathoms water.

Shoals.—About 8 miles south-west of Portendick, two shoals of 3 and 4 fathoms water are supposed to exist; and midway between these and Portendick there is a shoal with a depth of less than 6 feet over it.

Tides.—It is high water, full and change, at Portendick at 10h.; springs rise 6 feet.

COAST.—From Portendick the general trend of the coast is S.S.W. $\frac{3}{4}$ W., for 103 miles to the northernmost of the Marigots, or little channels, which carry off the overflowings of Senegal river in the rainy season; this channel is named the Marigot des Maringouins, and its mouth is situated in latitude $16^{\circ} 37' N$.

The whole of the coast between Portendick and Marigot des Maringouins is low, nearly level, and interspersed with small bushes. Two patches, however, of red sand, partly covered with brushwood, may be perceived, but they are only discernible when within 2 miles of the beach; one is situated in latitude $17^{\circ} 25' N$., the other in $16^{\circ} 55' N$.

From the mast-head some sheets of water were observed at the foot of these elevated patches, and at 6 miles southward of them the interior appears to be partially clothed with brushwood, but the coast remains uniformly barren. At the distance of 2 or 3 miles from the beach there are regular soundings in from 6 to 12 fathoms on a bottom of fine sand, occasionally mixed with mud, and affording a ready anchorage.

Marigot des Maringouins.—Marigot des Maringouins is about 36 miles northward of St. Louis. When the rains have swollen Senegal river, the bank, at the entrance of this Marigot, is covered and may be crossed by boats, but always through a heavy surf.

SENEGAL RIVER.—To the southward of Marigot des Maringouins the basin of the Senegal is only separated from the ocean by a narrow

See chart No. 1,230.

* Commander F. W. Richards, H.M.S. *Dart*, 1862.

tongue of sand, which gradually decreases in height towards its southern extremity, and is named Côte de Barbarie. Within this tongue of sand the divided stream of the Senegal forms a number of small islands, on which a covering of bushes gives the country some appearance of fertility. During the rainy season the French armed steamers ascend as far as Medina, on the first cataract, a distance of 600 or 700 miles.*

Navigability.—The Senegal begins to rise in June, and in the upper river its level very soon begins to fill the numerous canals or channels through the banks, which in various directions penetrate the country for a considerable distance. These channels are locally known as “marigots.”

All the land bordering the river is soon inundated over a vast extent, and when the flood has reached its maximum height the shores are submerged and the country has the appearance of an immense lake, whence emerge the tops of the trees, and some of the more elevated ground on which the natives take refuge.

In the lower portions of the river the inundation proceeds slowly, and the maximum rise at St. Louis, near the entrance, scarcely occurs before the end of October, although the first floods make themselves felt almost at the same time in the lower as in the higher river.

According to observations taken during several years, the dates of maximum rise at the several places mentioned are as follows:—

Bakel ($14^{\circ} 54' N.$, $12^{\circ} 20' W.$), about 1st September; rise 42 feet to 49 feet.

Saldé ($16^{\circ} 13' N.$, $13^{\circ} 50' W.$), about 20th September.

Podor ($16^{\circ} 36' N.$, $14^{\circ} 58' W.$), about 10th October; rise 26 feet to 29 feet.

Richardtoll ($16^{\circ} 27' N.$, $15^{\circ} 40' W.$), about 22nd October.

St. Louis (near entrance), 1st November.

The height of the river at several different stations is telegraphed daily to St. Louis.

At the period of high river—from 15th August to 1st October—vessels drawing $16\frac{1}{2}$ feet can ascend the Senegal as far as the falls of Félou, about 500 miles from the sea. But at Saldé, Podor, and other places the river is often so narrow that there is no room to turn except by securing the stern to the shore.

From the month of November the navigation becomes very difficult in the upper river. From December to June no vessel can ascend beyond Mafu, 176 miles from the sea. There then exists in the lower part of the river only one difficult part, namely, between Richardtoll and Dagana, but the minimum depth there is 8 feet. The barges which draw only

* See Admiralty plan:—St. Louis, or Guet-n'-dar and Senegal bar, No. 1,001; scale, $m=0.9$ inch.

one foot can reach Bakel until the end of March, but are frequently obliged to unload to pass certain bars.

Vessels drawing 10 feet can proceed at all seasons to Mafu, a distance of 178 miles from the bar.

Senegal islands.—The names of these islands are Bequio, Gazelles, Bifeche, Griel, and Thiong, which last is connected with the island on which the town of St. Louis is built. Griel island, or, as it is locally termed, le Bois de Griel, contains some trees, the verdure of which offers a singular contrast to the 600 miles of desert northward of them. On either side of this green tuft the stream of the river may be seen from the mast-head over the sandy ridge; and it is the surest mark for indicating the landing-place to the northward of the bar.

Along this part of the coast, vessels may run at the distance of 2 miles from the beach, in from 12 to 8 fathoms water, over a clear bottom of compact green mud, which bottom is found between 15 miles north and the same distance south of St. Louis, on the parallel of which it extends 14 or 15 miles from the shore.

ST. LOUIS.—Southward of Île de Thiong will be seen the French establishment of St. Louis, with its white buildings. There is a dockyard at the north end of the isle of St. Louis. The narrow island on which the town stands is little more than a mile in length, and is connected to Île de Sôlir by a bridge of boats, 660 yards long; the principal passage is on its eastern side, and the western channel is so narrow, and its western bank so low, that from the offing the town appears to stand on the seashore.

Guet-n'-dar.—To the westward of St. Louis stands the village of Guet-n'-dar, defended by a battery, and from whence a canoe is immediately launched on the approach of a vessel, but the population of Guet-n'-dar, formerly so celebrated on the African coast as canoe men, have completely abandoned this service.

LIGHT.—A *fixed white* light, shown from the Government house on Île de St. Louis, should be visible, in clear weather, from a distance of 6 miles. From a signal-staff at the same place the depth of water on the bar is signalled.

It is proposed to exhibit a *fixed white* light from the north point of Île de St. Louis.

Communication.—A railway connects St. Louis with Dakar, the distance being 175 miles, and there is also a railway from Kayes to Diubéba: this railway is in course of construction to Manambugu, on the Niger, about 20 miles east of Bammako. A small steamer runs between St. Louis and Sierra Leone. There is telegraphic communication with Tenorife and Bathurst, *via* Gorée, with Pernambuco, *via* Fernando

Noronha; and with Timbuktu and the various stations on the river inland as far as Wagadugu.

Supplies.—At St. Louis, beef, mutton, poultry, and wood, may be procured at reasonable prices, the provision store being below the Sóhr bridge. Water is brought into the town from Khassak lagoon by means of an aqueduct, 15 miles in length, and the river water is said to be good during the winter months, but quite undrinkable after December; a tank vessel then ascends the river and supplies the town and shipping.

Coal.—There are about 10,000 tons in stock at the beginning of June, but no coal is imported between June and November; the coal store is about 4 cables north of the Sóhr bridge, and there is a quay for vessels to go alongside, but it is necessary to have anchors as off-fasts. Vessels, anchored in the roadstead, are coaled by means of lighters.

Pilots do not cruise in the offing but wait outside the bar; a second pilot boat and a life-boat are generally stationed near the entrance.

Native pilots for the river may be obtained at St. Louis, and it is stated they know the channels fairly well. To gain this knowledge they start up the river in a large boat at the commencement of the rise.

Tug.—The services of a steam-tug can be secured in crossing the bar.

Signals.—When the bar is practicable a staff with a blue flag is held perpendicularly in the pilot boat; if the staff and flag are inclined, the bar is impassable.

Anchorage.—The anchorage off the bar of Senegal river should be taken, according to the time of the year, in 9 or 11 fathoms water, or in other words, at 2 or 5 miles from the bar, but at all seasons a long swell prevails at this anchorage. Vessels also anchor abreast Guet-n'-dar in from 9 to 10 fathoms water, over mud, about 2 miles from the shore with the Government house at St. Louis bearing about S.E.

Good anchorage will be found outside the bar with St. Louis lighthouse bearing N.E. $\frac{1}{4}$ N.; and the village of Mouit, S.E. by S.

Vessels anchor inside the bar either above or below the Sóhr bridge, which is regularly opened at slack water, and at other times if requested and the current is not too strong; the opening is 67 feet in width, and it is always advisable to moor.

Bar.—A heavy sea breaks upon the coast, and for weeks, sometimes months, during the dry season, the entrance of the Senegal is closed by the sand which is thrown up. During the rainy season the bar is washed away and a new passage formed, which has yearly a slow movement to the southward.

In 1894 the entrance to the river was approximately in latitude $15^{\circ} 54'$, but in 1899 this entrance was reported to be closed and the bar to lie about one mile to the southward of that position. This bar constantly changes in position.

The dangers of Senegal bar are well known to navigators; in the rainy season, and even up to March, the great volume of water, which is poured out of the river, frequently renders the bar impracticable even to decked boats. The waves of surf, produced by the impetuosity of the stream meeting the ocean swell, are so prodigious, and succeed each other so rapidly, that it is impossible to find a quiet interval; and it is not uncommon on these occasions for the sea to break in a depth of 7 fathoms at a mile outside the bar.

From April to the end of September the bar is almost always passable by decked boats, and sometimes by open boats, but it is advisable that they should be managed by natives.

Depth on bar.—In December 1882, the depth on the bar was $9\frac{1}{2}$ feet at spring tides; a vessel drawing 6 feet bumped heavily when crossing it.

In 1898 the bar was stated to have a depth of 10 feet over it.

Vessels drawing more than 10 feet cannot as a rule cross the bar, and none should be employed in trading with this place which are too large to enter the port, as the employment of lighters is expensive and tedious, a steam-vessel to trade with advantage should not draw more than $8\frac{1}{2}$ feet.

When fairly in the river, from 7 to 5 fathoms will be found, and with the assistance of the tide, a pilot will speedily beat a sailing vessel up to St. Louis.

Directions. — Approaching from northward. — The mouth of Senegal river is not easily recognised when coming from the northward; the heavy surf which prevails upon the whole coast, and which breaks along Côte de Barbarie, prevents the surf on the bar from being distinguished, and vessels, keeping at too great a distance from the shore, might pass without seeing it.

From abreast of Guet-n'-dar they may safely run along it at the offing of a mile, and at that distance everything will be distinct. The cocoa-nut trees and square guard-house on Île de Babagné will be seen in passing. As the wind generally hangs to the northward, it is advisable to take a berth well northward of the bar, for the greater facility of communication with the shore.

The sand-hills north of St. Louis are rather higher than those to the southward. The ruined tower of Ndiago, formerly affording a conspicuous land-mark at about $8\frac{1}{2}$ miles northward of St. Louis, no longer exists, but near its former position there is a village easily recognised by two or three large warehouses with red roofs, erected on a small eminence.

Approaching from the southward.—In running for the Senegal from the southward, the mouth of the river is more easily perceived than from the northward, as it opens in that direction. At the distance of 35 miles south of St. Louis, and on the parallel of $15^{\circ} 26' N.$, there is a large red sandy elevation visible about 15 miles, which, to vessels

ignorant of their latitude, may serve to indicate their distance to the southward of the bar; when near the shore three palm trees may be seen near this sand-hill.

Gandiole telegraph station (Marché de Gandiole), $8\frac{1}{2}$ miles south of St. Louis, is also rendered conspicuous by a house with red roof and white gables. When proceeding to St. Louis the bill of health is shown here.

At about 12 miles south of St. Louis are situated the five sand-hills of Musseguib (Dunes de Musseguib), which are from 16 to 29 feet high, and on one of which there is a flagstaff.

Tides.—It is high water, full and change, at Guet-n'-dar and Senegal bar at 9h. 0m., and at St. Louis at 10h. Springs at the former places rise 4 feet and at St. Louis $6\frac{1}{2}$ feet.

Tidal streams.—Abreast of this river, and for a space of several miles to seaward, the powerful tidal streams, both in and out, affect the general uniformity of the southerly current, and are often so strong as to bring vessels, anchored in the outer road, with their broadsides to the wind in the strongest breezes. These outer tidal streams have no very regular set; the flood stream, however, generally runs E.N.E. and the ebb W.N.W.

From February until May the tidal stream is felt as far as Djouldé-diabé, 228 miles from St. Louis, the ebb stream being more rapid and continuing longer than the flood.

During the period of floods, the downward current attains a velocity of about 2 knots an hour at Podor, and 4 knots an hour at Medina.

COAST.—The western point of cape Verde bears from the bar of the Senegal river S.W. by W. $\frac{1}{4}$ W., distant about 90 miles, and the intervening curve is about 11 miles in depth.*

For about 10 miles southward of Senegal river the coast is as low as that to the northward; and though it then becomes rather higher it preserves throughout the same uniform appearance of a chain of white sand-hills, with scattered brushwood and here and there a few dwarf trees, until the monotony of appearance is broken by the four red sand-hills locally known as Tund or Méléye. The anchorage off these sand-hills is named Kelere road, and about 10 miles south of this a red sand-hill at Diakmat forms a good landmark.

Little paps.—To the southward of this sand-hill the coast does not present anything remarkable except the village of Benu Mboro, nearly 20 miles south-west of Diakmat, which may be recognised by the palm trees growing on the summits of the sand-hills, until latitude $14^{\circ} 56' N.$, which is the position of the northern of the Little paps, the two highest sand-hills to be seen between Senegal river and the Paps of cape Verde. They rise

See chart No. 1,001.

* See chart No. 1,230.

from the beach, and are easily known by a slight undulation on their summit, and by three or four small hills to the southward; they are of dark colour, and visible at the distance of 12 or 15 miles.

There are several villages along the coast between Senegal river and cape Verde, the principal of which are Kelere, Mboro, and Cayar; at Mboro the vegetation, being unusually thick, is conspicuous.

Landing can generally be easily effected at Cayar.

Depths off shore.—From Senegal river so far as the parallel of $15^{\circ} 20' N.$, at 2 or 3 miles from the coast, the bottom is of mud, in from 11 to 27 fathoms water; thence to the southward the depth rapidly increases, as at 6 miles west of the Little paps there are from 57 to 62 fathoms. The same bottom continues, and is so soft that the lead sinks in it, offering good anchorage to any vessel obliged to come to in consequence of calms.

Yof bay, extending from the anchorage off Cayar to Almadi point, should not be too closely approached, as the currents in it are strong and irregular, especially during the winter season. The village of Yof situated 3 miles east of Almida point, is unimportant: here a reef which always breaks, extends 3 cables from the shore and joins Yof island.

It is said that a considerable river is connected with the lagoons at Yof bay.

Coast.—Cape Verde paps, bear about W. by S., distant 27 miles from the Little paps, and in fine clear weather both may be seen at the same time, as the cape Verde paps are visible from distances of 20 to 25 miles. At the former distance, east of the cape, the coast begins to rise and to show more wood, the country about cape Verde being covered with trees, amongst which there are several of considerable height. The bank of soundings here is steep, and all this coast may be approached to a very short distance.

Almadi point, the north-west extremities of cape Verde and the westernmost point of Africa, is flat, but has several small detached paps on it.

LIGHT.—The lighthouse on Almadi point is a square tower 39 feet in height, rising from the centre of the keeper's dwelling and painted white. It exhibits, from an elevation of 85 feet above high water, a *fixed and group flashing red and white* light, which has a period of system of *thirty-four seconds*; showing *fixed white*, high power, for *seventeen and a third seconds*; *fixed white*, diminished power, *one and two-thirds seconds*; a *white flash*, high power, for *three and two-thirds seconds*; then *fixed white*, diminished power, for *seven and two-thirds seconds*, followed by a *red flash* during *three and two-thirds seconds*.

See chart No. 1,230.

The *white* light should be visible in clear weather, from a distance of 14, and the *red* from a distance of 13 miles.* The lighthouse is built on the western side of the point; from it cape Verde lighthouse bears S.S.E. $\frac{3}{4}$ E., distant 2 miles, and the extremity of Almadi ledge to the westward is distant one mile.

Almadi ledge.—From the extreme west point of cape Verde, a reef of black rocks named Almadi ledge, extends a mile, and is mostly awash, but in two or three places some of the rocks rise 8 or 10 feet above high water. The westernmost of them has the form of a cube, and stands in lat. $14^{\circ} 44' 30''$ N.†

At 3 miles north of this rock there is a depth of 71 fathoms, over mud and sand; at a mile west of it 31 fathoms, over shells; and though there is less water S.S.E. of it, vessels may everywhere approach the ledge within a mile, making allowance for a probable inset of the current. It is said that there are one or two openings through the ledge.

CAPE VERDE, is situated 2 miles south-south-east of Almadi point, but this name is generally given to all the extremity of that peninsula forming the west side of Gorée bay, which is moderately high land, rising gradually to the two paps, the south-western face of which is nearly perpendicular, and is usually mistaken for cape Verde when seen from a distance. The cape itself terminates in low land, on which are some detached hillocks, which might be taken for islets when seen from a distance.

LIGHT.—On the western mound of cape Verde, in latitude $14^{\circ} 43' N.$, and longitude $17^{\circ} 31' W.$, a cylindrical lighthouse, 66 feet in height, painted white, with a bronze-coloured lantern, exhibits from an elevation of 370 feet above high water, a *revolving white* light, having a period of revolution of *half-a-minute*, which should be seen, in clear weather, from a distance of 27 miles, but which was reported (1892) as only visible 13 miles.

An electric *flashing* light is under consideration.

A Semaphore station, with which vessels can communicate by the Commercial Code, is established near the lighthouse on the western mound (the Paps) at cape Verde. The semaphore is in telegraphic and telephonic communication with Dakar. It is not known whether messages from vessels are telegraphed to Europe.

Tidal streams.—Near the shore, at cape Verde, the tidal streams are very appreciable, the flood dividing into two branches, one setting to

* Action reported to be irregular, and distances at which the flashes are visible to be less than those given above; 1898.

† See Admiralty chart:—Africa, West coast, Sheet vi., cape Verde to river Cacheo, with views, No. 599; scale, $m = 0.14$ inch.

the northward, the other towards Almadi point; the flood stream occasions strong and irregular currents in Yof bay; the ebb stream sets off shore.

Cape Manuel (Baniul).—From Almadi ledge, cape Manuel bears about S.S.E. $\frac{3}{4}$ E., distant 9 miles. The intervening shore is high, covered with trees, and generally terminates at the sea-side in basaltic cliffs or rocks, in a few places the cliffs descending into small bays, with beaches of white sand. The cape is high, covered with thick brushwood, and “steep-to” on its south side, but at the distance of a cable north-westward of its south extreme, and close to the beach, there is a small rock above water.

LIGHT.—The light tower on cape Manuel, the south-east extreme of cape Verde, is square, 39 feet in height, and painted white, and exhibits from an elevation of 170 feet above high water, a *fixed red* light, which, in clear weather, should be seen from a distance of 8 miles. The lighthouse is built on the cliff; from it cape Verde light bears N.N.W. distant 6 miles.

The colour of this light is not well marked, and it is proposed to alter to a *flashing red* light.

Madeleine islands consist of a group of four rocky islands situated N.W. by W. $\frac{1}{2}$ W., distant 2 miles from cape Manuel, and a little more than half that distance from the coast; the largest, shaped like a crescent, open to the westward, is about 3 cables in length, and consists of a hard red rock with some basalt, destitute of any vegetation, though it appears that formerly a few baobab trees grew in its crevices.

On the north side there is a very small creek which affords a landing place. The sea breaks with great violence over the three smaller islands, and through the channel between them and the largest, in which there is a depth of 3 fathoms.*

In approaching these islands from cape Verde the soundings vary from 30 to 17 fathoms.

Madeleine channel.—There are depths of from 4 to $4\frac{1}{2}$ fathoms in mid-channel between Madeleine islands and the mainland; steam vessels of 12 feet draught will save fuel by using it, but no attempt should be made to beat through.

GORÉE BAY.—The extensive bay of Gorée, with the island of that name, immediately opens on rounding cape Manuel; and as the water is everywhere deep, vessels bound to the island, which bears E. by N., distant $2\frac{1}{4}$ miles from the cape, may steer for it direct if the wind permit.

See chart No. 599.

* See plan :—Gorée road, on Admiralty chart No. 1,001; scale, $m = 2 \cdot 5$ inches.

The channel between Gorée island and Dakar point is seldom used by sailing vessels when entering the bay, as a strong current setting to the southward prevails in it.

LIGHT.—The guard ship, moored half a mile E.N.E. of Dakar east jetty, exhibits a *fixed red* light from her foremast.

Gorée island, half a mile in length in a north and south direction, and 450 yards in breadth, is of volcanic formation, similar to that of the Madeleine islands, and cape Manuel. The southern and highest portion is 144 feet above the level of the sea; the rest of the island lowers to the north point. The old citadel is a cylindrical tower situated on the north extreme of the island, and on the west side is a small battery.

A shoal bank, on the outer edge of which there are depths of from $1\frac{1}{2}$ to 2 fathoms, extends along the western side of Gorée island for a distance of $1\frac{1}{2}$ cables from the shore.

Gorée is a free port and the head station for the French fleet on the South African coast. The population is about 2,800. The landing-place is on the north-east side.

CAUTION.—Boats landing at Gorée island should always have an anchor and cable ready to veer in with.

Supplies.—Water is scanty, and the quality bad, the chief supply for the inhabitants is brought from the village of Hann on the mainland, as well as their fuel. There are several large stores on Gorée island, from which supplies of European produce can be obtained. The bay abounds with fish, and the seine may be used in Hann road.

Gorée road.—The roadstead, situated north-eastward of Gorée island, is sheltered from winds from S.W., through north, to East, and perfectly safe during eight months of the year, that is from November to June inclusive; but during the rainy season squalls from the south-eastward are dangerous.

Anchorage.—The best anchorage for large vessels, in either season, is at the distance of three-quarters of a mile north-east of the landing place on Gorée island with cape Manuel open northward of the island, bearing about W. by S. $\frac{3}{4}$ S., where they will find depths of 9 or 10 fathoms, over stiff clay, and from whence they can conveniently get under weigh with the wind from any quarter.

To reach this anchorage in the fine season, when the prevailing winds are from north-east to north-west, it is necessary to haul close round cape Manuel and the south extreme of Gorée island, and keeping by the wind on the port tack, with the lead going, to stand on till within a mile of the shore on the eastern side of the bay, and tacking there in 9 or at least in

See chart No. 1,001.

7 fathoms. If not able then to fetch the road, make short boards along that shore, as the southerly current is less strong there, and sometimes even a northerly eddy will be found.

In the tornado season, from the berth recommended, if the quality of the ground tackle be suspected, a vessel may easily run out of the road; for which purpose it will be prudent to veer away nearly to the end of the cable so as to be able to slip when everything is ready, and before the weight of the squall comes, accompanied, as it generally is, with a deluge of thick rain.

Having slipped, give the north extreme of the island a convenient berth, and when to the westward of this point, whatever may be the violence of the squall (which is generally from S.E. by E. or E.S.E.), the island will afford sufficient shelter to enable the vessel to keep the wind nearly abeam till abreast the south extreme. Having reached thus far, bear up nearly four points to W. $\frac{3}{4}$ S., and pass cape Manuel. From thence the sea is open, and there is nothing to avoid but the Madeleine islands, and Almadi ledge off cape Verde.

Mooring.—A vessel intending to remain for any considerable time at the anchorage, should moor E.N.E. and W.S.W., that the eastern cable may be veered so as to bring an equal strain on both in the heaviest squalls.

Rufisque or Venus bank.—A bank about 3 cables long and $1\frac{1}{2}$ cables broad, with 4 fathoms water on it, lies E. $\frac{1}{2}$ S., distant $5\frac{1}{2}$ miles, from the south extreme of Gorée island, and about 2 miles from the shore on the eastern side of Gorée road.

Resolute shoal, situated about 4 miles, W. by N. $\frac{1}{2}$ N., from Rufisque village, and about $1\frac{1}{2}$ miles from the shore, has over it a least depth of 9 feet, and must be carefully avoided by vessels beating into Gorée road.

Tides.—It is high water, full and change, at Gorée island at 8h. 8m.; springs rise about 5 feet.

DAKAR.—Dakar point lies about $1\frac{1}{2}$ miles north-east of cape Manuel, and about $1\frac{1}{4}$ miles westward of Gorée island; Belair point, long, low, and having on it a baobab tree, lies N.N.E. $\frac{3}{8}$ E., distant $1\frac{8}{10}$ miles from Dakar point, and between is Dakar bay; there are depths of $2\frac{1}{2}$ and $2\frac{3}{4}$ fathoms, distant about $1\frac{1}{2}$ cables east and south respectively from Dakar point.

The town of Dakar stands in the southern part of Dakar bay; it is the central point of French commerce with the African coast, and in 1891 the population was 8,737. The country in the neighbourhood is open, and slightly undulating, with but few trees and little vegetation; small patches of land are cultivated, millet and ground nuts being grown; but the soil, almost entirely composed of sand, is poor.

LIGHTS.—From an iron ladder 25 feet in height, over a shed on a masonry base, at the extremity of the east pier of Dakar harbour a *fixed green* light is exhibited at an elevation of 30 feet above high water, which should be visible, in clear weather, from a distance of 5 miles.

A *fixed red* lantern light is exhibited from the inner pier.

A *fixed red* lantern light is shown from the wharf when the mail steamer is expected.

Communication.—A railway extends from Dakar to St. Louis, a distance of 175 miles, and skirts the north shore of Gorée bay until about 2 miles south-eastward of Rufisque. Steamers belonging to the British and African Steam Navigation Company and Marseilles Steam Navigation Company call at Dakar.

There is telegraphic communication with St. Louis, and with Bathurst, and telephonic communication generally throughout the town, also with the lighthouse on cape Verde and various places outside the actual limits of the town; communication is obtained through the post office. There is a road to Wakkam, near cape Verde, also to Fort Belair, the other roads leading to the interior are merely bridle paths.

Coal and supplies.—The Messageries Maritimes Company may be able to supply Welsh coals, which would be brought alongside in lighters containing about 40 tons; generally eight of these lighters are kept loaded, the coal being in bags. The coal stores are situated on the quay between the two moles, and a large supply of patent fuel, belonging to the Government, is kept near this; no labour is available for coaling purposes. About 3,000 tons are usually kept in store.

The water supply, almost entirely dependent upon rain, is insufficient for the town; the water is collected from sand dunes and led by pipes in various reservoirs; there is also a reservoir on the swampy ground in Hann bay from which water is brought in boats, but it is intended to connect the town with this by pipes.

Fresh meat may be obtained but vegetables are scarce; fish are abundant.

English money is not in circulation, and is generally refused.

Repairs.—There is no dockyard at Dakar, but the guardship moored between Dakar point and Gorée island has been converted into a floating factory, and provided with machinery, lathes, forges, &c., and small repairs may be executed.

Moles.—Two moles extend in a northerly direction, from Dakar point affording some shelter in a space about 2 cables square. The eastern mole is about 14 feet wide, with a wall on the eastern side against which the

sea breaks with considerable force; this has caused a great deal of damage, and about 150 yards from the extremity is (1898) useless for practical purposes.

The depths alongside are 25 feet at the northern portion; 16 feet at the southern and 23 feet midway; the line of rail is continued on the mole, so that trucks can be run alongside vessels lying there. Alongside the west mole for a distance of 150 yards from the extremity there is a depth of 16 feet, and a depth of 9 feet alongside for the remaining portion.

There are a number of sailing boats and iron lighters for loading and unloading ships and a service of large steam launches running between Dakar and Gorée.

Mooring buoys.—There are several mooring buoys northward of the moles, five of which are laid out, in a north-east direction, from the extremity of the eastern mole. There is also a buoy to which large vessels may make fast and swing in a depth of $3\frac{3}{4}$ fathoms.

Hospital.—The military hospital, to which foreigners are admitted, is situated on the hill southward of Dakar.

Submarine telegraph cables.—The shore ends of the cables to Bathurst and to Gorée are landed in Bernard bay; here there is landing immediately beneath the telegraph hut.

Anchorage.—The anchorage at Dakar is safe, except during the season of tornadoes; as these squalls generally come from S.E., a nasty sea is sometimes raised in a short time. A fresh N.E. breeze causes a choppy sea; for coaling purposes the anchorage recommended is between the extremes of the moles and well to the eastward.

Belair point, situated $1\frac{1}{10}$ miles north-north-east from Dakar point, is rocky, and the termination of the peninsula dividing Dakar and Hann bays.

Belair shoal, situated nearly a mile eastward of Belair point, and N. by E. $\frac{1}{2}$ E., distant 2 miles from the north extreme of Gorée island, is about 4 cables in length, within a depth of 3 fathoms, lies nearly east and west, and has 7 feet least water on it.

Hann bay.—The coast of Hann bay curves to the westward and northward, from Belair point to the watering-place, which is about a mile in a north-north-west direction from the point.

Anchorage.—The anchorage in Hann bay is about a mile from the watering-place, in a depth of 21 feet, or nearer the shore, according to the vessel's draught.

Directions.—Vessels proceeding from Gorée road, to the watering-place in Hann road, must avoid Belair shoal by passing eastward of it in

5 fathoms water, at $1\frac{1}{2}$ miles from Belair point, or between it and that point, at half a mile from the latter, in a depth of $3\frac{3}{4}$ fathoms, taking care to avoid the shoal water which extends $4\frac{1}{2}$ cables south-east from the point.

Clearing mark.—Bernard point (a low rugged projection, the next north of cape Manuel), well open east of Dakar point, bearing S.W. by W., leads 4 cables south-eastward of Belair shoal; and the eastern hummock of cape Verde bearing N.W. by W. $\frac{1}{2}$ W. leads 4 cables north of it.

Rufisque, situated E. by S. $\frac{1}{2}$ S., distant 8 miles from Belair point, is rendered conspicuous by a square white tower, visible from a distance of 8 or 9 miles; on the east side of the tower there are several factories, from one of which a pier extends, and to the eastward of this there is a substantial wharf for discharging cargo.*

The town has well laid out streets, is a great commercial centre, and the most important railway station between St. Louis and Dakar; in 1894 the population was 9,000.

A reef of rocks forms a small bay to the eastward of the point, which is much frequented by coasting vessels.

LIGHT.—A *fixed red* light is exhibited from the tower situated to the westward of Rufisque at an elevation of 52 feet above high water; it should be visible, in clear weather, from a distance of 3 miles.

Supplies.—Fresh provisions at reasonable prices may be procured at Rufisque.

Anchorage.—The anchorage, in from $3\frac{1}{2}$ to 7 fathoms water, is good during eight months of the year, but from July to November, South and W.S.W. winds send in a very heavy swell.

Sai-Sai rocks, above water, and about 2 cables long in a north and south direction, lie W. $\frac{3}{4}$ N., distant 6 cables, from Rufisque point; the north extreme of the rocks is about 2 cables from the shore.

COAST.—From Gorée road the coast rises a little, at some miles inland from the low white sandy strand; east of Rufisque commence a series of small sand hills, wooded, and separated by valleys with large trees. There are several villages near the shore, but the surf generally prevents landing. In advancing to the south-eastward the sand-hills progressively rise, and are covered with trees so far as cape Naze, which lies S.E. $\frac{2}{3}$ E., distant 20 miles from cape Manuel.

Red cape, lying S.E. by E. $\frac{1}{2}$ E., distant 14 miles, from Gorée island, is the northern of three projections which are the prominent features of this part of the coast; it is tolerably high, of a reddish colour, and with cliffs

* See plan:—Rufisque anchorage, scale, $m = 1\cdot0$ inch, on Admiralty chart No. 599.

separated by ravines, on the former a few stunted bushes, but in the latter usually large trees.

The middle projection, known as Tubab Guialao, is somewhat similar in appearance to Red cape, but not so high; it lies about 2 miles south of that cape, and has a group of rocks extending about 100 yards from the shore at its base.

Between Rufisque and Red cape are situated the villages of Bargni and Hyenne, or Yen, the position of the former being marked by some dark rocks on the beach, and the latter being built on a slight eminence and fronted by a bank on which there is about 4 fathoms water.

The village of N'diangel, about 2 miles south of Red Cape, is composed of scattered houses, and here the coast is almost entirely covered with clumps of trees presenting a remarkably green appearance. The village of Pobinguem, about 5 miles south of Red Cape, may be recognised by its church, which stands on the grey cliff, and may be seen from a great distance. Landing may be easily effected, in the fine season, in a cove fronting the village.

Cape Naze, a remarkable looking cliff of yellow and reddish colour, is the southern of these three projections, it terminates in cliffs of about 1,200 feet above high water, the woody summit of which may be seen from a distance of 20 to 25 miles in fine weather; in the space between it and Hann road several negro villages will be seen, which are frequented by the coasting vessels of Gorée, who trade with them for stock; at 2 miles from this shore depths of from 7 to 13 fathoms may be obtained.

Cape Naze is bold-to, and when approaching from the northward the land south of it appears as a low point covered with trees.

Gombaru point, lying S. $\frac{3}{4}$ E., distant 3 miles from cape Naze, is a low point terminating in a sand-bank; the village of the same name stands on the coast near the point. From about 2 miles south of Gombaru point an extensive series of banks commence, which front the shore so far as the entrance to the river Gambia.

The river Samon, barely navigable for canoes, empties itself south of Gombaru point, and here are the villages of Samon and N'gaparu, south of which is a remarkable clump of trees.

Portudal, a village consisting of several groups of houses, situated S.E. by S., distant 3 miles from Gombaru point, has a bank about a mile wide lying off it, which in some parts nearly dries at low water, but there are depths of 3 fathoms between it and the shore reef; 4 fathoms close to its west side; and 9 fathoms $4\frac{1}{2}$ miles west of it.

A square white tower, built for the accommodation of the French garrison, is a conspicuous object at Portudal.

Landing may be effected in a cove about half a mile wide, where small craft anchor, the depth being about 16 feet between the entrance points, decreasing gradually to the shore, over a bottom of sand mixed with mud.

Anchorage.—Small vessels anchor off Portudal, in $4\frac{1}{2}$ fathoms water, over sand, with the largest cluster of houses bearing E.N.E., those of larger draught anchor in a depth of 6 fathoms, with the same houses bearing E. by N.

Serin point.—From Gombaru point to Serin point, which latter is low and marked by a village upon it with a conspicuous house, the bearing is S. by E. $\frac{5}{8}$ E., and distance 15 miles; between these points the coast recedes a little, and is fronted by rocky shoals, while shallow irregular soundings are found at a distance of 3 or 4 miles from the shore.

At 4 miles south of Portudal is the village of Mbur, and a mile further, in the same direction, the outlet of the Baleine, a small stream nearly dry in the fine season; its mouth may be recognised by some heaps of black rock on the beach.

Near the village of Warrang, 4 miles south of Mbur, there is a salt lake said to communicate with the sea during the rainy season, and about a mile further south is the village of Yonning (Nianing) which exports a quantity of ground nuts; steamers anchor and load here during the fine season.

Mbur bank.—The flat and foul ground between Portudal and Serin point is connected with Mbur bank, which projects W. $\frac{1}{4}$ N. nearly 7 miles from Serin point. The western portion of the bank is a crooked reef, about $4\frac{1}{2}$ miles in length, in a north-east and south-west direction. Its western extreme is awash, and on other portions the sea always breaks in bad weather, or shows a strongly discoloured line of water. There is a depth of 4 fathoms close to its outer edge, but no vessel should approach it nearer than 6 fathoms.

The inner edge of the bank is from 3 to 4 miles from the shore, leaving a navigable channel between for vessels of small draught at all times, and even for large vessels in a case of great emergency. This inner channel is generally adopted by coasting vessels when beating to the northward, as they find there smoother water and less current, and are well acquainted with those tints upon the sea which indicate open or shoal water. No landmarks are to be recognised on this coast; but there is no danger in standing in towards any part of the shore,

provided the lead be kept going, and the vessel kept in not less than 7 fathoms water, which is at least a mile outside of any danger.

Tides.—It is high water, full and change, on Mbur bank about 8h. 15m. ; springs rise 6 feet.

Point Gukwe.—At a distance of $7\frac{1}{2}$ miles, S. by E. $\frac{3}{4}$ E., from Serin point lies point Gukwe, the coast between forming a shoal bay, from the shores of which shallow banks extend nearly 4 miles; outside of them, however, and southward of Mbur bank, the water shoals regularly up to the line of 5 fathoms.

The French mission of St. Joseph, which is an agricultural as well as a religious establishment, is situated about one mile north of point Gukwe, the buildings include workshops, steam sawmills, machinery for dressing cotton, schools, &c., and are conspicuous for a long distance.

Joal village, situated on the banks of a river of the same name, is rendered conspicuous from seaward by a chapel and square tower near the beach, which are visible from a distance of 7 or 8 miles.

Fajodj or Fadjudj river.—At 4 miles south-south-east from Joal point there is an inconsiderable stream, named the Fajodj, the bar of which, at low water, is almost dry, and at high water is only passable by canoes and vessels under 6 feet draught.

Palmerin point, a slight projection of the land, with a clump of trees upon it, nearly 5 miles south of the river Fajodj, has a reef extending from it 2 miles to the westward; there are large villages both north and south of the point.

Joal patches.—Between point Gukwe and Palmerin point there are several shoal places on the bank which extends from the shore, of which some dry at low water, these shoals are known as Joal patches.

Joal flat.—Between Fajodj river and Palmerin point a bank with less than 6 feet on it, known as Joal flat, extends a considerable distance from the shore.

All this portion of the coast should be navigated with great attention paid to the soundings, and by keeping in 7 fathoms water, a vessel will not be nearer than 2 miles to any danger.

Sangomar (Punshavel) point.—A straight uninteresting coast, with a broad sandy beach, and the country inland covered with trees or brushwood extends for 15 miles in a S. by W. direction, from Palmerin point to Sangomar point, a long narrow spit, the northern limit of the great estuary which leads into the river Gambia. At 10 miles south of Palmerin point there is a large gap named Lagoba; this is an old outlet of the Salum river, and forms a good mark.

Depths off shore.—The coast between cape Verde and river Gambia should not be approached in hazy weather under a depth of 7 fathoms by vessels of large size. On the meridian of cape Verde and at 27 miles west of Gombaru point the depth is 63 fathoms, and the bank “steep-to.”

At 18 miles west of Portudal the depth is 19 fathoms, shoaling gradually to 8 fathoms at 5 miles from that place. Off Serin point the water gradually deepens from Mgrbur bank, and at 21 miles in a westerly direction from that point the depth is 20 fathoms, whence to the parallel of Sangomar point, the 20-fathoms line follows the curve of the shore at a distance of about 18 miles.

* See chart No. 599.

CHAPTER VII.

CAPE VERDE ISLANDS.

VARIATION in 1900.

St. Vincent island - - - 20° 0' W.

Nearly stationary.

CAPE VERDE ISLANDS.—There are ten principal islands and four smaller ones; the group lies to the west of cape Verde, distant about 320 miles.*

The channels between the islands are generally navigable; and the passage eastward of the group is clear of danger, the depth midway to cape Verde being 1,950 fathoms, mud and shells. In this passage, and to the north-east of the group the sea is frequently much discoloured, caused probably by the meeting of currents. See Chapter I., page 31.

ST. ANTONIO ISLAND, the north-western of the Cape Verde islands, is high, and may be seen from a great distance in clear weather, but the summit is generally clouded.

The island is 22 miles in length in an E.N.E. and W.S.W. direction, with a general breadth of 11 miles; Tope da Coroa the highest mountain, situated at the north-west part, is 7,400 feet above high water. The population in 1895 was 23,735.

North point (Punta do Sol), extends as a low sandy point some distance from the cliffs at the north extreme of the island, it has a reef projecting from it, but at $1\frac{1}{4}$ miles north of the point the depth is more than 100 fathoms.

LIGHT.—A *fixed red* harbour light, intended as a guide to the anchorage, is exhibited from North point, St. Antonio island, from a pillar of masonry 18 feet in height, at an elevation of 23 feet above high water, and should be visible in clear weather from a distance of about 3 miles.

Santa Cruz, the chief town of the island is situated on North point; the custom house and church are conspicuous objects. A small supply of water can be procured here.

Vessels occasionally anchor off the town, in from 14 to 18 fathoms water, over good holding ground.

* See Admiralty chart :—Cape Verde islands, No. 366; scale, $m=0.15$ inch.

Coast.—The north coast is nearly straight for 18 miles in a westerly direction from North point to the west extreme of the island ; whence to South point the intermediate coast recedes about 2 miles ; at 2 miles north of South point there is a bight named Tarrafal bay.

East point is situated 9 miles S.S.E. from North point ; midway a point projects about a mile beyond that line, this projecting point has some rocks lying off it, and a village situated south-eastward of it.

Bull rock.—At 2 cables east of the northern extremity of East point, there is a small rocky islet, with some rocks extending from it.

LIGHT.—The lighthouse on Bull point (locally known as Lombo du Boi), and near Bull rock, is 34 feet in height, octagonal shaped, constructed of rough stone, and painted white, as is also the keeper's dwelling, southward of, and adjoining, it.

The light (named Fontes Pereira de Mello) is a *fixed and flashing white* light, with a period of system of *one minute*, elevated 543 feet above high water ; the *flashes* should be visible in clear weather from a distance of 27 miles, the *fixed* light from a distance of about 16 miles : the period of the light was reported as *forty-five* seconds in 1892.

South coast.—The south side of the island is nearly straight for 17 miles in a W.S.W. direction from East point, when it turns and trends W. by N. for a distance of 6 miles to South point. West of East point, at a distance of $8\frac{1}{4}$ miles, a small stream known as Rio Janella empties itself into the sea, to the eastward of which there is a bight named Carboeiros bay, where indifferent anchorage can be obtained, off a few houses standing on a sand and gravel beach.

At 12 miles westward of East point is situated the village of Santa Cruz, and off the point which lies $1\frac{3}{4}$ miles westward of that village, a reef and foul ground extends about a mile, narrowing the channel between St. Antonio and St. Vincent islands to a breadth of 6 miles.

Directions.—When approaching from the northward, the land should not be neared within 5 miles on the east side of the island, as calms prevail that distance from the shore. The channel between St. Antonio and St. Vincent islands is safe, and the eye must serve as a guide to keep clear of the light winds that may be occasioned by either island.

Tarrafal bay.—There are several anchorages round St. Antonio island available for small craft, but none equal to Tarrafal bay that is situated on the west side, 2 miles northward of South point, where a vessel may lie in safety, and where the best water may be procured that is afforded by the Cape Verde islands. Near the watering place there is a plantation of bananas, papayas, &c., and in the lower sandy grounds a cotton plantation.*

See chart No. 366.

* See Admiralty plan :—Tarrafal bay, No. 369 ; scale, $m = 4.1$ inches.

A shoal, with 4 fathoms water over it, lies one cable north of the south entrance point of Tarrafal bay, and a bank, on which the depth is $3\frac{1}{2}$ fathoms, N.N.E. $\frac{7}{8}$ E., distant $1\frac{1}{2}$ cables from the same point.

Directions.—Tarrafal bay may be known by a green plantation, and a black sandy beach under a cliff, that come in view after rounding South point. In rounding South point, allowance should be made for a current which sometimes sets towards it. A good berth may be taken up in 39 fathoms water, 3 cables off shore, with a red mark in the cliff bearing E. by S., but care is necessary when anchoring, as the shore is nearly “steep-to.”

The bay is open from S.W. by S. to N. by W., but the winter winds seldom blow home; in December and January, however, there is generally a swell that occasions some surf on the beach.

There is a conspicuous white mark low down on the cliffs, situated 2 miles north of Tarrafal bay.

Supplies.—The water which drains from the hills is collected in small reservoirs, the nearest to the beach being about 50 yards from the high-water line, and here the water is said to be brackish. No other supplies can be obtained.

Tides.—It is high water, full and change, in Tarrafal bay at 7h.; springs rise about 5 feet.

ST. VINCENT, the most useful of the cape Verde islands, is situated about 7 miles south-eastward of St. Antonio island, with a clear channel between them. It is 30 miles in circuit, composed of mountains of volcanic origin, that are divided into two ranges by a valley extending from the south-west part of Porto Grande, to within 2 miles of the east extreme of the island. The north-east portion of the island is the highest, where Green mountain rises 2,483 feet above high water. With the exception of a little green tamarisk scrub, the island is perfectly barren. The population, in 1895, was 6,211.*

North coast.—Between Ponta Columna and Ponta do Ribeira Julian, the eastern entrance point of Porto Grande, the north side of St. Vincent is cliffy, high, and rugged; the former point is surmounted by a rock, which, seen from a distance, resembles a column. The north-east side of the island is indented by two open bays, known as Solamasa bay and Praia de Gatta (Praia Grande) bay, the latter frequented by fishermen; the coast is low, and should not be approached.

Passaro, Bird, or Jow island, $1\frac{1}{2}$ cables long, north and south, and three quarters of a cable broad, lies 7 cables N.W. $\frac{1}{2}$ W. from Ponta do Ribeira Julian; it is rocky, bold-to, 270 feet above high water, and appears conical.†

* See Admiralty plan:—St. Vincent island, No. 369; scale, $m = 0.8$ inch.

† See Admiralty plan: Porto Grand, No. 370; scale, $m = 4$ inches.

LIGHT.—A *fixed white* light is exhibited from a cylindrical iron lighthouse, 40 feet in height, on Passaro (Bird) island. It is elevated 306 feet above high water, and should be visible in clear weather from a distance of about 14 miles, except where obscured by the land of St. Antonio and St. Vincent islands.

The buildings, connected to the lighthouse by a white wall with steps sloping to the summit of the island, are very conspicuous, and may be seen some time before the island of St. Vincent if the weather is thick.

Semaphore station.—There is a semaphore station on Passaro island from which messages will be transmitted to an agent of Lloyd's; passing vessels should communicate by the Commercial Code of Signals.

Porto Grande.—This bay, situated on the north-west side of St. Vincent, is 2 miles wide at the entrance and $1\frac{1}{2}$ miles deep, the outer points bearing E. by N. $\frac{3}{8}$ N. and W. by S. $\frac{3}{8}$ S. from each other; it is the port of call for numbers of steamers as well as for vessels of war requiring coal.

Between the points of entrance the bottom is even, with a depth of 22 fathoms in the centre, shoaling gradually on the west side to 9 fathoms, which is found three-quarters of a cable from the shore; to the eastward there are 17 fathoms within a short distance of the coast. In the centre of the bay the depth is 10 fathoms, shoaling gradually in all directions towards the shore. Sharks frequent the bay: and owing to the heavy gusts of wind off the high land, boat-sailing is at times dangerous.

In the eastern bight of Porto Grande is the town of Mindello, with, in 1896, a population of 6,666, mostly blacks in the employ of the coaling companies.

LIGHT.—On the extremity of the Custom-house pier at Mindello, a *fixed red* light is exhibited from an iron support at an elevation of 16 feet above high water, and should be visible, in clear weather, from a distance of 3 miles.

Communication.—The steamers of the British and African Steam Navigation Company call twice monthly, and steamers arrive from, and leave for, Europe almost daily. See page 32.

Telegraphic communication with Madeira, Pernambuco, and Bathurst.

Post Office signals.—Signal flags, indicating the places for which mails are being made up, are hoisted at the post office.

Coal is stored on shore, and is supplied in bags, or in baskets if required, from iron barges holding from 20 to 130 tons, towed by steam launches, and vessels can coal at the rate of 1,200 tons per day, or 1,800 tons, working day and night. About 16,000 tons of coal are usually kept in stock, 1,000 tons being ready in lighters. Vessels under certain restrictions can coal while in quarantine. On rare occasions strong N.E.

winds impede coaling, which is also impracticable from colliers on account of this swell, and the wharves have not sufficient water alongside.

Coal signals.—Messrs. Miller & Co. have a code of signals for the use of vessels coaling.

Supplies may be procured to a limited extent. Water is supplied from a floating tank, but steam vessels would probably find it cheaper to distil their own.

Repairs.—Small repairs only can be made to the hull or machinery; there are sheers which will lift 15 tons, and a crane $1\frac{1}{2}$ tons.

A building slip is being constructed.

Tugs.—There are four good steam tugs.

Custom house.—Vessels bringing cargo for the port are required to be supplied with a Consular manifesto. Vessels, calling for coals only, require no documents.

Hospital.—There is a Government Hospital, to which admittance for sailors can be had by permission of the Health Officer, on payment.

Quarantine.—There is an establishment at Porto Grande, on the rising ground on the south-west shore of the bay, the houses are red brick and conspicuous. It can accommodate about 50 people, and has a landing pier.

All vessels calling must be supplied with a Portuguese bill of health.

Telegraph cables.—Two submarine cables communicating with Madeira and Rio de Janeiro are landed in the northern bight on the east side of Porto Grande; north of the cable house there are some native dwellings painted white, which are conspicuous. Two additional telegraph cables have been laid from the northern part of Porto Grande, for communication with Madeira and Pernambuco respectively.

There is a telegraph cable to Bathurst.

Buoys.—Three large spherical buoys, painted black, each surmounted by a white disc supported by two iron rods, mark the telegraph cables.

The northern buoy is moored in $7\frac{1}{2}$ fathoms water, with ponta do Ribeira Julian bearing N.N.E., distant 4 cables; and ponta Ribeirinha W. $\frac{1}{4}$ N.

The middle buoy is moored in $6\frac{3}{4}$ fathoms water, one cable S. by E. $\frac{1}{4}$ E. of the outer buoy. The southern buoy is moored in a depth of 7 fathoms, with the Fort bearing S. E. by S., distant $3\frac{1}{2}$ cables.* The paint on these buoys is luminous.

Orontes bank, on which there are general depths of 2 and $2\frac{1}{2}$ fathoms, over sand and coral, extends about 4 cables from the south-east side of the bay.

See chart No. 370.

* In 1898 the top mark of this buoy was broken off.

Anchorage.—There is ample sheltered anchorage ground in Porto Grande. With N.E. winds violent squalls are of frequent occurrence, and vessels should always be prepared with a second anchor in case of parting or drifting. Vessels of large draught are recommended to anchor well clear of Orontes bank. A good berth is in 10 fathoms water, over gravel, with Passaro island bearing North, and the fort, situated half a mile north of the town, bearing E.S.E.

If in want of coal, a berth should be taken in the south-east part of the bay, with the fort bearing about E. by N. and avoiding Orontes bank; here the water is smoother and the squalls less felt.

Prohibited anchorage.—Anchorage eastward of the telegraph buoys, or in the vicinity of the telegraph cables, is prohibited. Vessels approaching from the northward at night should not anchor, or steer towards the anchorage, until the red light on the Custom house pier (which is obscured by Fort point) is in sight, bearing about S.E. by S.

CAUTION.—In coming to in Porto Grande, under sail, shorten sail in time, and look out for heavy gusts over the high land.

Directions at night.—When entering Porto Grande at night the high land all round is very deceptive, and Passaro island is the only guide; it always shows clearly and distinctly, even on the darkest nights. After passing Passaro island, bring it (in a large vessel) to bear North, and anchor on that bearing in 10 fathoms water, over sand, the west entrance point of the bay bearing W. by N.

Trade.—During 1896, 1,227 vessels entered the port, having a total of 2,272,726 tonnage. The chief imports are coal, American dry goods, Manchester goods, and Portuguese produce; the total value of imports during the year amounted to £270,331; the exports, consisting of coffee and skins, to £98,000.

Tides.—It is high water, full and change, in Porto Grande at 6h.; springs rise $3\frac{1}{4}$ feet.

South coast.—The south-east extreme of the island has some detached rocks extending from it, whence to the south and west points the shores are apparently bold.*

From a distance of 12 miles to the north-eastward, the south-east extreme of St. Vincent, surmounted by a high hill, appears as an island.

LIGHT.—On point Machado, the west point of San Pedro bay, a rectangular shaped lighthouse, 45 feet in height, built of masonry, with an iron cupola, dwelling attached, and painted white, exhibits, at an elevation of 183 feet above high water, a *flushing white* light with a period of system of *six seconds*, which should be visible, in clear weather, from a distance of

See chart No. 370.

* See chart No. 359.

15 miles, between the bearings of S. $\frac{2}{3}$ W., through south, to N.N.W. $\frac{3}{4}$ W.; but westward of San Antonio it is obscured when bearing south of S.E. $\frac{1}{4}$ E. This light is reported to show *nine flashes every minute*.

Submarine telegraph cable.—The telegraph cable to Porto Praya and Bathurst, west coast of Africa, is landed here.

Anchorage.—San Pedro bay.—There is anchorage during the dry season, in 10 fathoms water in San Pedro bay, south of the west extreme of St. Vincent, and wood and water can be obtained from the bays in that vicinity.

About 3 miles south-east of San Pedro bay, anchorage may be obtained in Carcavellos cove in 19 fathoms water, over sand and mud, on a line joining the two entrance points. Temporary anchorage, over sandy bottom, might also be obtained in Grande cove.

Foul channel.—The north-west extreme of Sta. Lucia island is distant from the south-east extreme of St. Vincent 4 miles in a S.E. by E. direction; the passage between them is named Foul channel. In this channel, when blowing fresh and with the tide setting to windward, there is an appearance of shoal water, but H.M.S. *Leven* beat through, and did not find less than 6 fathoms, with 15 fathoms in mid-channel.

STA. LUCIA ISLAND.—The north extreme of Sta. Lucia island is situated E. by S. $\frac{3}{4}$ S. distant 5 miles from the south-east extreme of St. Vincent. The island is 6 miles in length in a north-west and south-east direction and $1\frac{1}{2}$ miles in width, Monte Grande the summit, 1,209 feet above high water, being near the middle, with a range of hills extending from it to Punta Praia dos Mastros the north, and Punta Cruz the south, point.*

Almost all the coast is rocky and unapproachable, affording no secure anchorage, but good landing may be obtained at $1\frac{1}{2}$ miles east of Punta Cruz.

Shoal water extends for about half a mile from the coast between Punta Cruz and Punta Tarafe.

Punta Creoulo (East point), high and surmounted by several peaks named Creoulo hills, is separated by low land from Punta Cruz north-east of which is Caramujo hill, 910 feet above high water.

Porto or Leon islet, lying N. by W. $\frac{3}{4}$ W. distant $1\frac{1}{10}$ miles from Punta Cruz, is moderately high, and in the bay between are the ruins of a village and a well of good water.

Anchorage.—Temporary anchorage may be obtained during the fine season in this bay, in from 8 to 15 fathoms water, over sand and pebbles.

See chart No. 369.

* See Admiralty plan:—Sta. Lucia, Branca, and Raza islands, on sheet No. 369; scale, $m = 0\cdot8$ inch.

BRANCA ISLAND, lying S.S.E., distant 5 miles from Punta Cruz, Sta. Lucia island, is high and inaccessible except in very fine weather; the south extreme is low and sandy, and has a reef extending a short distance from it. Branca island is 2 miles long in a N.N.W. and S.S.E. direction and half a mile broad, the summit over the northern part of the island is 978 feet above high water.

Depths in channel.—Between Sta. Lucia and Branca islands there are depths of from 8 to 13 fathoms; H.M.S. *Leven* anchored, during the survey in 1820, in 12 fathoms water, over hard bottom, with the east extreme of Sta. Lucia bearing N.N.E. $\frac{1}{2}$ E., and Punta Cruz N.W. $\frac{3}{4}$ N.

CAUTION.—When navigating between Sta. Lucia and Branca islands, the south and east coast of Sta. Lucia should not be approached within a mile, as the ground is uneven; the water, when 2 or 3 miles north-east of Sta. Lucia, becomes discoloured, which may serve as a guide in approaching the island.

Tides.—It is high water, full and change, between Sta. Lucia and Branca islands at 7h.; springs rise about 5 feet.

Tidal streams.—The flood stream sets to the westward, and the ebb to the eastward with a velocity of 2 knots an hour during springs.

Current.—A south-westerly current of $2\frac{1}{2}$ knots an hour, has been experienced at 10 miles north-east of Branca island.

RAZA ISLAND, situated 8 miles W. by N. $\frac{3}{4}$ N. from West point of St. Nicholas island and $2\frac{3}{4}$ miles south-east of Branca island, is a small cliffy island with almost inaccessible shores, 5 miles in circuit, composed of hills, the highest of which, near the centre of the island, being 316 feet above high water.

In the channel between Branca and Raza islands the soundings are irregular, varying from 6 to 18 fathoms.

ST. NICHOLAS ISLAND, the easternmost of the north-west group of the cape Verde islands, is of irregular shape; its greatest length being 25 miles in a W.N.W. and E.S.E. direction; the north-west portion is the highest, where Monte Gordo attains an elevation of 4,415 feet above high water; whence to the east extreme a range of mountains of about 2,000 feet high extends, conspicuous amongst them being the Sugar-loaf mountain near the middle of the island. The island is more under cultivation than any other of the group, corn, vegetables, and fruit being grown; the population in 1895 was 12,093. In clear weather this island has been seen from a distance of 80 miles.*

* See Admiralty plan:—St. Nicholas island, on sheet No. 369; scale, $m = 0.5$ inch.

Punta Pedra d'Enxova (East point).—The east extreme of the island is a promontory 13 miles in length with an average breadth of $2\frac{1}{2}$ miles, composed of mountains between 1,500 and 2,000 feet above high water, and terminating in a plateau, with a rock upon it that resembles a sail; some detached rocks fringe the north shore of this promontory.

From Punta Pedra d'Enxova the nearest land to the eastward is the island of Sal, the south point of which bears E. by S. $\frac{3}{4}$ S., distant about 60 miles.

Freshwater bay, $4\frac{1}{2}$ miles westward of Punta Pedra d'Enxova, is an open bay with deep water close to the shore, where, in fine weather and at neap tides, fresh water may be obtained.

St. George bay, or Porto Velho.—The south side of St. Nicholas island is indented by St. George bay, which forms a bight 5 miles deep, between Punta Alvacora and Punta Vermelharía, the south point; Punta Alvacora bears E. $\frac{1}{4}$ N., distant $12\frac{1}{2}$ miles from Punta Vermelharía.

Rolla road, the principal commercial port of the island, is situated on the north-west side of St. George bay, and 6 miles north-east of Punta Vermelharía; it is readily recognised by the conical hill over it, known as Monte Formoso, and the flagstaff on the fort of Preguiza.*

There is a stone quay at Preguiza, and a rock off the entrance is connected with the land and forms a mole; they afford shelter to coasters which frequent the place.

LIGHTS.—A *fixed white* light visible over the anchorage is shown from the flagstaff situated N. E. by E. $\frac{1}{2}$ E. distant $2\frac{3}{4}$ miles from the fort at an elevation of 128 feet above high water, and should be seen in clear weather from a distance of about 17 miles.

A *fixed red* light is shown from a post in the middle of the central quay; it should be visible in clear weather from a distance of 2 miles.

Supplies.—A small quantity of fresh provisions might be procured, but water is difficult to obtain.

Anchorage.—Vessels may anchor in Rolla road, in from 10 to 13 fathoms water, over sand, with the fort bearing N.W. by W. Vessels merely wishing to obtain supplies are recommended to stand off and on.

Squalls.—The bay of St. George and St. Nicholas island generally, is, during any breeze, subject to furious squalls, which give no warning.

Punta Pataca (Krabbe point), the west limit of Rolla road, has foul ground extending from it, and should not be approached nearer than three-quarters of a mile.

* See plan of Rolla road on Admiralty plan, No. 369; scale, $m = 6$ inches.

Punta Vermelharia (South point).—The south extremity of St. Nicholas island is a narrow promontory projecting 5 miles, the moderately high land of which forms the western limit of St. George bay, and the eastern limit of Tarrafal bay.

Tarrafal bay.—From Punta Vermelharia the coast trends in a general N.N.W. direction for 10 miles, to a round sandy point situated $1\frac{1}{2}$ miles south of West point. Midway between Punta Vermelharia and West point the coast recedes 2 miles, forming Tarrafal bay, where anchorage may be obtained during the fine season, in 20 fathoms water, at 3 cables off shore. Heavy squalls blow down the ravines on the north side of this bay.

At the southern part of Tarrafal bay is situated a custom house; water may be easily procured and provisions from the neighbouring villages.

West point.—The west extreme of St. Nicholas island is low and rocky, with soundings for 4 or 5 miles to the southward at a distance of from a half to three-quarters of a mile from the shore.

LIGHT.—On West point a *fixed white* light is exhibited, at an elevation of 39 feet above high water, from an iron building, 20 feet in height, painted red, and having a masonry base; the light should be visible seaward in clear weather between the bearings of N. by E. $\frac{3}{4}$ E. to S. by W. $\frac{3}{4}$ W. (180°) from a distance of 10 miles. The keeper's dwelling, painted white, is close to the eastward of the lighthouse.

Anchorage.—A vessel might anchor under the lee of West point in a calm, during the fine season, a good berth being in 35 fathoms water, at three-quarters of a mile off shore, with West point bearing N.E. $\frac{1}{2}$ N., distant one mile.

North point.—From West point the coast trends in an east-north-east direction for 7 miles, where the north extreme of the island is formed by a round clifly point, having a summit 2,311 feet above high water. On the north-west side of this point a sand-bank fringes the coast, and a reef of rocks extends to the northward for a distance of 5 cables. North-west bay, situated about 2 miles north-east of West point, has a small island in the centre, and is used by small craft.

Punta Coruja or Queimadinhas, low and stony, bears from North point S.E. by E., distant 8 miles, the coast between forming a bight $2\frac{1}{2}$ miles deep, from the head of which Tarrafal bay is distant 5 miles in a W.S.W. direction, and St. George bay about 3 miles in a southerly direction. Eastward of Punta Coruja the coast trends S.E. by E. for 13 miles to Punta Pedra d'Enxova, and is composed principally of cliffs, having rocks and sand at their bases.

Tides.—It is high water, full and change, at St. Nicholas island at 7h. 0m.; springs rise 5 feet (approximate).

SAL ISLAND, the north-eastern of the Cape Verde islands, is 17 miles long in a north-north-east and south-south-west direction; the northern portion being about 5 miles wide, with rocky shores and mountains, Monte Grande, the northern of which is 1,340 feet above high water. The island narrows towards the south extremity, where it terminates in a dangerous sandy spit of considerable length, which is "steep-to."*

The only production of this island is salt, which is brought to the sea-shore on railroads. The number of inhabitants in 1895 was about 550.

LIGHT.—North point.—A *fixed white* light is exhibited, at an elevation of 81 feet above high-water, from a cylindrical-shaped iron lighthouse, 44 feet in height, and painted grey, on the north point of Sal island; the light should be visible, in clear weather, from a distance of 15 miles, between the bearings of E. by S. $\frac{5}{8}$ S., through south and west, to N.W. $\frac{5}{8}$ W. The keeper's dwelling, painted white with red roof, adjoins the lighthouse.

Coast.—The north and east sides of the island are steep and rocky; Piedra Lume, 5 miles south of North-East point, is a conical hill, rising immediately over the coast. East, or Red hill point, $6\frac{1}{2}$ miles south from Piedra Lume, has almost a conical summit, named Red hill, over steep cliffs.

Punta Leme Velho (Wreck point), 5 miles south-south-west of Piedra Lume is low, sandy, and fringed with rocks, which extend half a mile from the shore.

LIGHT.—South point.—On the south point of Sal, 328 yards within the extreme, a square-shaped iron structure, 19 feet in height, painted red with a shed painted green, standing north-west of it, exhibits, at an elevation of 31 feet above high water, a *fixed white* light which, in clear weather, should be visible from a distance of 8 miles between the bearings of S. $\frac{1}{4}$ E., through east, to N.W. $\frac{3}{4}$ W. (230°).

Port Santa Maria or South bay, at the south extreme of the island, is formed by Punta Leme Velho, the south-east extreme of Sal, and South or Sino point, which bears from it W. by N., distant $2\frac{1}{2}$ miles.

Anchorage may be obtained in fine weather, in 7 fathoms water, in the centre of Port Santa Maria, just inside the line of its entrance points; too great caution cannot, however, be exercised when navigating near South point, as a spit extends nearly a mile S.S.E. from the low sandy shore, with 14 fathoms close to its outer edge, and at $1\frac{1}{4}$ miles from the shore the depth is 25 fathoms.

A vessel might also anchor on the west side of South point in 7 fathoms water, half a mile off shore, with South point lighthouse bearing

* See Admiralty plan:—Sal island, on sheet No. 369; scale, $m = 0.5$ inch.

E. by S. $\frac{1}{4}$ S. The only settlement on the island is at the head of Port Santa Maria.

Directions.—In passing south of the island care must be taken, especially at night, to avoid South point, as the low sandy spit extending from it is “steep-to”; the water should not be shoaled to less than 30 fathoms.

Mordeira bay, on the west side of Sal island, situated 6 miles north of South point, is about 2 miles deep.*

Passaro or Bird island, off the north entrance point of the bay, is small, connected to it by rocks, and from it, Turtle point, the low south entrance point of the bay, bears S.S.E. distant 4 miles.

Shoal ground is reported to extend from Turtle point, on the south side of Mordeira bay; it is composed of coral, and extends more than one mile, in a west direction, from Turtle point, with depths of from $3\frac{1}{4}$ to 5 fathoms. Vessels entering Mordeira bay from the southward should give Turtle point a berth of 2 miles.

Anchorage.—Mordeira bay affords good anchorage, except during the rainy season, when southerly winds blow in, accompanied by rollers, making it unsafe. A good berth is in 12 fathoms water, with Passaro island just shutting in by the north entrance point, bearing about N.W., and Turtle point south, but care should be taken to ascertain the quality of the bottom before anchoring, as there are many foul spots in this bay. A good mark for recognising Mordeira bay, is a conspicuous hill, 620 feet above high water, over Lion’s head (the north entrance point, which somewhat resembles the head of that animal).

Water cannot be obtained in Mordeira bay.

Palmira bay, about 3 miles north of Passaro island, should not be used as an anchorage except in case of necessity. From Machado point, its north extreme, a reef extends nearly a cable to the southward, under shelter of which a few trading vessels moor.

CAUTION.—Haze.—The island may be seen in clear weather from a distance of 30 or 40 miles, but sometimes the haze is so thick, not only about the island of Sal, but over the Cape Verde islands generally, that the surf is seen before any land can be recognised.

Depths off shore.—The east and north sides of Sal are fronted by rocks extending half a mile from the shore; on the west side of the island, between the north-west extreme and South point, soundings, in from 20 to 30 fathoms, can be obtained one mile off shore.

Tides.—It is high water, full and change, at Sal island at 7h. 45m.; springs rise 5 feet (approximate).

* See Admiralty plan:—Mordeira bay, No. 369; scale, $m = 1\cdot0$ inch.

Current.—In the neighbourhood of Sal the current generally sets to the south-west at the rate of about half a knot per hour ; but between the islands it is frequently strong, irregular, and influenced by the wind.

BONAVISTA, or BOAVISTA ISLAND, nearly circular in shape, is 50 miles in circuit, 1,260 feet above high water, and partakes of the general mountainous character of the group ; it may be seen from a distance of 35 miles. The shores are low, and consist principally of long sandy beaches separated by rocky points with detached dangers lying off them.*

Bonavista is traversed through the centre from north to south by a high range of mountains, separated from isolated hills on the north-east and south-west portions by deep valleys. The northern summit of this range is a treble peaked mountain, known as mount Juan Fernandez ; near the eastern extremity of the island are some extensive salt pans, the manufacture of salt being the chief industry. The population in 1895 was 3,776.

Anchorage may be obtained in three places off the west side of Bonavista island—in English road ; off Coral reef ; or in Portuguese road ; the former of these places is the best, where a vessel may anchor inside or outside the reef off the small island, in view of the town.

Rollers.—About this island the rollers are very heavy, and render remaining at anchor unsafe ; there is not any stated time for their setting in, but they often occur at the full and change of the moon.

CAUTION.—A south-westerly current generally sets strongly towards Bonavista island. When drawing near, a good look-out should be kept ; in clear weather the dangers show themselves, but when misty it is not advisable to approach the island, as the currents about it are sometimes irregular.

East sand-head, or Reef point, the east extreme of the island, is very dangerous to approach, being low and fronted by rocks extending a mile from it ; while at 2 miles from the shore the depth is 55 fathoms.

South-west of East sand-head, distant $1\frac{1}{2}$ miles, a reef of rocks extends 6 cables from the shore.

Hartwell point bears N. by W., distant nearly 6 miles from East sand-head, and the bay between, known as Puerto del Norte, or Canto, is encumbered by islets and shoals, of which the principal are Dutch island, Braithwait island, North cay, and Hartwell reef.

Hartwell reef.—The north-east extreme of Bonavista island is fronted by islets and rocks extending for a distance of $3\frac{1}{2}$ miles from the

* See chart No. 366.

shore, the outer shoals being named the Hartwell reef, on which many vessels have been set by a south-westerly current and wrecked. The reef is "steep-to," there being more than 100 fathoms at half a mile eastward of it.

Directions.—When in the vicinity of Hartwell reef the north extreme (Sol point) of Bonavista island should be kept open north of Broyal point, bearing W. by N. $\frac{3}{4}$ N., and the south-east bluff of the island (Brazen hill bluff), open east of the East sand-head, bearing S.W. $\frac{3}{4}$ W. Too great caution cannot be exercised at night or in thick weather when passing eastward of the Cape Verde islands.

Broyal (Derrubada) point, situated N.W. $\frac{3}{4}$ W., distant 4 miles from Hartwell point, is an extensive rocky projection that separates the sandy beaches between Sol and Hartwell points from each other; foul ground extending three-quarters of a mile from Broyal point. Salina bay, between Sol and Broyal points, is $1\frac{1}{2}$ miles deep, and fronted by rocks extending 2 miles from the shore.

Sol point, the north extremity of the island, is rocky and foul for about half a mile from the shore, at one mile from which the depth is 30 fathoms. Sol point bears from the south extreme of Sal island S. by W. $\frac{3}{4}$ W., distant $21\frac{1}{2}$ miles, the channel between them being free from danger, but the current generally sets strongly to the south-west through it and on Bonavista island.*

North bluff, about 2 miles south-west of Sol point, is steep and clifty. Sol point reef, situated $1\frac{1}{2}$ miles south-west of Sol point, and half a mile north-west of North bluff generally breaks.

ENGLISH ROAD (P. Sal Rei).—At $1\frac{1}{4}$ miles S.W. $\frac{1}{2}$ S. from North bluff, is situated Sal Rei island, connected to the shore by a reef half a mile in length, and about $4\frac{1}{2}$ miles further in the same direction is situated point Areia, low and rocky; between these points, and receding on a sandy shore for 2 miles, is English road, in which are several reefs.

In the northern part of English road is situated the town of Sal Rei, and at $2\frac{1}{4}$ miles south of it is the new town of Rabil, conspicuous by the belfry of its church: between the towns are extensive salt pans.

In the northern part of the road there is a wharf adapted to the use of small vessels.

LIGHT.—An iron lighthouse, 20 feet in height and painted red, with a keeper's dwelling (white with red roof) close northward of it, situated on Sal Rei island, northern side of English road, exhibits, at an elevation of

See chart No. 366.

* *See Admiralty Plan :—English road, P. Sal Rei, scale, $m = 0.8$ inch, on chart No. 369.*

91 feet above high water, a *fixed white* light, which should be visible in clear weather for a distance of 8 miles.

English reef, that generally shows, lies S.W. $\frac{3}{4}$ S., distant 8 cables from Sal Rei lighthouse, with a depth of 5 fathoms between the island and the reef.

Inner reef lies about 4 cables from the shore, about three-quarters of a mile south-west of Sal Rei; and Rabil reef, about 3 cables from the shore, north-west of Rabil; these reefs are connected to the shore at low water.

Anchorage.—On a line between point Areia and English reef there are depths of from 8 to 11 fathoms. East of English reef, with Sal Rei island summit bearing North and mount Juan Fernandez E. by S., a good berth may be taken up in 11 fathoms water. It is a safe anchorage during the summer months while the N.E. wind prevails.

Directions.—Coasting vessels usually haul close round Sal Rei island, passing north of English reef, but a stranger should bring Rabil church to bear E.S.E. and pass southward of it.

Tides.—It is high water, full and change, in English Road at 7h. 30m.; springs rise 5 feet (approximate).

CORAL REEF.—Nearly 2 miles W. by S. from point Areia there is a small islet surrounded by rocks and apparently connected to the shore; from the islet Varandinha point bears S. by E. distant 2 miles, and at 4 miles north-west from it there is a depth of 38 fathoms; a vessel might find anchorage off this reef.

Varandinha reef.—Nearly midway between Areia and Varandinha points, a reef named Varandinha, extends about a mile from the coast in a westerly direction, and between it and point Areia there is a fringe of breakers.

Varandinha point, the western extremity of Bonavista island, is low, sandy, and distant from Curral Velho point 11 miles in a general north-west direction. The intermediate coast is formed by two round sandy points, having foul ground extending some distance from them.*

Curral Velho point, the southern extremity of the island, is a cliffy termination of low sandy ground, fronted to the south-east, at a distance of three-quarters of a mile, by South, or Curralinho island, which is small, low, and half a mile in circuit; the ground off the island as well as off Curral Velho point is foul for some distance, but at one mile southward of Curral Velho point there is a depth of 13 fathoms.

See chart No. 369.

* See chart No. 366.

From the point, a slightly curved, sandy beach, 9 miles long in an E.N.E. direction, extends to Brazen Hill (Orvatão) bluff, the south-east extreme of Bonavista island, which is surmounted by a conical hill.

Portuguese road, on the west side of Curral Velho point, affords sheltered anchorage from N.E. winds in 14 fathoms water, at three-quarters of a mile off shore. Fresh water is scarce.

LETON ROCK, between Bonavista and Mayo islands, on which one of a fleet of East India ships was totally, and others nearly, wrecked, is the summit of a bank of coral, which, within the 100-fathoms line, is about 15 miles long in a N.N.E. and S.S.W. direction and about 9 miles broad; no part of it is above water, and it breaks heavily in moderate weather but not in a smooth sea.

From the middle of the shoal the south extreme of Bonavista island bears E. $\frac{1}{2}$ N., 21 miles; north extreme of Bonavista bears N.E., distant 28 miles; but the exact position of the rock has been questioned.

Soundings.—North of Leton rock, distant $1\frac{3}{4}$ miles, the depth is 34 fathoms, the bottom white coral; W. by N. 3 miles from the rock the depth is 63 fathoms, over coarse sand, shells, and coral; S. by W. $\frac{1}{2}$ W., distant 3 miles, there are 40 fathoms water, over fine sand and coral; S.E. $\frac{1}{2}$ E., 2 miles from the rock, 39 fathoms, over green sand, and broken shells; East, distant $1\frac{1}{2}$ miles, 41 fathoms over fine sand; N.E. of the rock, at a distance of 3 miles, there are 46 fathoms, and at 5 miles N.N.E. the depth is 76 fathoms, the bottom a fine light sand with red specks.

MAYO ISLAND lies E.N.E., distant 13 miles from the south-east point of St. Jago island, and S.W., distant 44 miles, from Curral Velto point, Bonavista island; it is 12 miles long north and south, with an average breadth of 6 miles. The central part of the island is level, but on the eastern side are the mountains of San Antonio, Pinos, and Mayo; and on the south-west side are three peaks, which are in line when bearing North or South.*

The highest part of the island is about 720 feet above high water, and it may be seen from a distance of 30 or 35 miles, but there are several low sandy points, and when making it from the south-east, it appears at a distance of about 15 miles, as a group of islets. The number of inhabitants in Mayo island is about 1,000.

Supplies.—Superior cattle are bred on the island; salt is produced in large quantities, and fish are plentiful, but wood and water are scarce.

The soil of the island is generally dry and sterile, and there is but one spring of water.

See chart No. 366.

* *See plan of Mayo island; scale, $m = 0.5$ inch, on Admiralty sheet of plans, No. 369.*

Coast.—The east side of the island is mostly rocky ; the other sides have low and sandy points.

North point.—This point is low and narrow, jutting out nearly 2 miles, with detached rocks on its east and west sides extending one mile from it ; to the north-eastward it should not be approached nearer than 4 miles, nor without great caution.

Galhao, or North reef.—A dangerous group of rocks, one mile long in a north-east and south-west direction, lies $1\frac{1}{2}$ miles off the north extreme of Mayo island, with foul ground between it and the shore. The north-east extreme of the reef bears from North point E. by N. $\frac{1}{2}$ N. distant 2 miles.

N.N.E. of Galhao reef, distant 6 miles, there is a bank on which the least water obtained was 45 fathoms over sand, with more than 130 fathoms water between it and Leton rock.

Foul point lies 2 miles S.W. from North point ; the bight between is full of rocks.

Rocky point is rocky and foul, and at one mile northward of the point the depth is 14 fathoms. H.M.S. *Perseverance* was totally wrecked here on October 21st, 1860.

Puerta Calheta is a deep bight situated immediately south of Rocky point ; there is a rock, with less than 6 feet water on it, midway between the entrance points of this bight.

Saltpan point forms the northern, and Town point the southern, limit of English road ; Town point is foul for a distance of $2\frac{1}{2}$ cables from the shore. From Saltpan point the nearest part of St. Jago island is distant 13 miles in a W. by S. direction.*

English road is a bay at the south-west extreme of Mayo island $1\frac{3}{4}$ miles wide and three-quarters of a mile deep, its entrance points bearing from each other N.N.W. $\frac{1}{2}$ W. and S.S.E. $\frac{1}{2}$ E.

The town of Nossa Senhora da Luz, the capital of the island, is situated on the shore of this bay.

LIGHT.—A small iron lighthouse, 20 feet in height and painted red, in the N.N.E. angle of fort San José, exhibits at an elevation of 62 feet above high water, a *fixed red* light, which should be visible in clear weather from a distance of about 7 miles.

Anchorage.—Vessels may anchor in English road in from 10 to 30 fathoms ; a good berth is in 12 fathoms water, with Town point bearing S.S.E. $\frac{3}{4}$ E. and Flagstaff hill N.E. $\frac{1}{4}$ E. When approaching this anchorage

See chart No. 369.

* See plan of English road ; scale, $m = 2$ inches, on chart No. 369.

caution is requisite, as the bank of soundings is very steep. A steam-vessel might anchor from $2\frac{1}{2}$ to 3 cables from the shore, as the wind is generally off the land, but sometimes the rollers set in, which would compel a vessel to shift out or go to sea. The bay is sheltered from north and east winds, but completely open to those from S.W.

Landing as a rule is very bad; there is a crane on the rocks for loading or discharging boats, but the operation is much impeded if there is any swell.

South point.—The south extreme of the island is low, and terminates in a sandy point.

Blisset reef.—At 2 miles N.W. by W. $\frac{2}{3}$ W. from South point and 2 cables off shore is a sunken reef, with a depth of 7 fathoms a short distance south of it. Saltpan point, open south of Town point, bearing N.N.W. $\frac{1}{2}$ W., leads clear south-west of it.

Tides.—It is high water, full and change, at Mayo island at 6h. 30m.; springs rise about 5 feet.

Current.—North-west of the island of Mayo a set to the south-west, at the rate of three-quarters of a knot per hour, has been experienced in the month of October.

ST. JAGO ISLAND.—The principal and south-east island of the Cape Verde group is 30 miles in length in a north and south direction, with a general width of 12 miles, narrowing to 4 miles at its north extreme. Mount St. Antonio, the summit of the island, situated near its centre, is 4,670 feet above high water. The shores of the island are rocky, and off the east and south-east coasts are some detached rocks. The population in 1895 was 62,530.*

From a commercial and agricultural point of view this is the most important island of the group; many of the valleys are watered by streams which do not dry, and have a considerable amount of land under cultivation.

LIGHT.—At Porto do Lobo, near the eastern extreme of St. Jago, a *fixed red* light is exhibited, at an elevation of 33 feet above high water, from the seaward face of a small, square, stone building painted white; it should be visible, in clear weather, from a distance of 7 miles.

Santiago point, the south-east extremity of St. Jago island, is low, projecting, and surrounded with breakers; when seen from the northward or southward it appears as a long low point.

Portale, or St. Francis harbour, is the western of two bights in the coast situated immediately west of Santiago point: there are a few houses and trees, with a small stream at the head of this harbour.

See chart No. 369.

* See chart No. 366.

Coast.—Between Portale and Porto Praya the coast is steep and rocky; a conspicuous hill (Signal post hill) is situated $1\frac{3}{4}$ miles N.N.E. from the entrance to Porto Praya.

PORTO PRAYA, at the south extreme of St. Jago, and the principal anchorage of the island, is safe in the dry season from December to June inclusive, for vessels of any size, but during the rainy season the wind occasionally sets in strongly from the southward, with a heavy swell and short sea, that render it unsafe for sailing vessels.*

Vessels, having occasion to visit this place during the rainy season (July to September), should anchor well out, in 17 fathoms water. The bay is open to the southward, its points of entrance bearing W. $\frac{3}{4}$ N. and E. $\frac{3}{4}$ S., distant $1\frac{1}{2}$ miles from each other.

The eastern side of the harbour is high and cliffy, with numerous indentations between the town and Punta das Bicudas, the eastern entrance point; the western side of the harbour is sandy so far as Quail island, from which cliffs extend to Punta Temerosa, the western entrance point, which is high.

The town, built on a table land nearly 100 feet above high water, between deep ravines east and west of it, has three winding roads leading to it from the sea side.

The inhabitants number about 4,000, a few of whom are Portuguese by birth, many descended from Portuguese parents, but the greater number are negroes.

Ribeira Grande was formerly the residence of the Portuguese governor of the Cape Verde islands; but in consequence of the anchorage becoming blocked up, the seat of government was shifted to the town of Praya.

LIGHTS.—On Punta Temerosa, an octagonal shaped, stone lighthouse, 54 feet in height, with keeper's dwelling, all painted white, exhibits, at an elevation of 85 feet above high water, a *fixed white* light, which should be visible in clear weather from a distance of 13 miles. There is a signal station near the lighthouse.

A *fixed red* light at the end of the Custom-house pier, near the western part of the town, should be visible 2 miles in clear weather.

Note.—Too much reliance should not be placed upon the lights as they were established, and are kept up, by private enterprise only.

Communication.—There are bi-monthly steamers from Lisbon, also irregular steamers from other parts; telegraphic communication with St. Vincent, Dakar, and the ports on the west coast of Africa.

See chart No. 366.

* See plan, Porto Praya; scale, $m = 4.6$ inches, on Admiralty sheet of plans No. 369.

Coal and supplies.—Generally a large stock of coal is in store at Quail island, and coal in bags kept loaded in lighters, can be put on board with despatch; steam tugs tow the lighters alongside. Vegetables, poultry, and fresh meat are plentiful and cheap; fruit also during the season, oranges being very good.

Good water may be obtained from a floating tank or from a Government pipe at the head of the mole. Spars suitable for a lower mast of a vessel of 500 tons are procurable.

Hospital.—There is a good civil and military hospital.

Pier.—The well-built wooden pier, painted red, to the south-west of the town, with $2\frac{1}{4}$ fathoms water alongside its outer end at low water, is about 100 yards long, and situated in front of the custom house.

The old stone mole at the town is in a dilapidated condition, and has not water enough for boats to go alongside the steps at low water.

Trade.—In 1896 the port was entered by 474 vessels including coasting steamers, the aggregate tonnage being 150,194 tons. The exports consist of raw sugar, rum, hides, goatskins, coral, maize, beans, cattle, poultry, and fruits; the imports of dry goods, woollen, and linen goods, flour, hardware, timber, the amount of both being about 114,000*l*.

Quail island, connected to the shore by a reef of rocks, is situated in the western part of the anchorage, it is a quarter of a mile long, 200 yards broad, and 53 feet high; coal wharves have been built on the west side of this island.

Beacon.—An iron tripod, the top of which is 41 feet above the ground, was formerly used for a light; it stands on the south end of Quail island, and forms a good mark.

Bank.—A bank with a depth of 6 fathoms over it has been reported to lie between the entrance points of Porto Praya, and nearly south of the town. This may be a part of the 7 fathoms shoal, situated about 3 cables E.S.E. of the south point of Quail island, or a continuation of it to the southward. The bearing on the chart, and also in the directions for entering (the centre of the town N. by W.), should be used with caution.

Shoals.—There is a shoal, with a depth of $2\frac{1}{4}$ fathoms over it, one cable south-west of Punta Temerosa lighthouse; a shoal, with $2\frac{1}{2}$ fathoms water over it, half a cable south-west of Punta das Bicudas; a shoal of 3 fathoms half a cable off the south entrance point of Pitada cove, and three shoal spots having depths of $2\frac{3}{4}$ and 3 fathoms over them in the bay north-east of Quail island and outside the 3-fathoms line.

Quarantine.—The lazaretto is near Punto Temerosa lighthouse.

Submarine telegraph cables.—The cables from St. Vincent and Bathurst are landed in a small bay west of Punta Temerosa peninsula, the cable house, built of iron, is situated on a sandy hillock above the shore.

Anchorage.—The bay may be approached with the centre of the town bearing N. by W., and steam-vessels anchor abreast of Quail island in 8 fathoms water, over very good holding ground of volcanic sand, with the east entrance point of the bay bearing E.S.E.; if intending to anchor closer in, Punto Temerosa must be kept open south of Quail island, bearing about S.W. $\frac{1}{2}$ W. to avoid the shoals of $2\frac{3}{4}$ and 3 fathoms in the bay.

CAUTION.—Strong gusts come over the land into Porto Praya during the fine season, when the breeze is fresh; therefore a vessel entering, under sail and intending to anchor, ought to have a reef in the topsails, and be ready to clew up the top-gallant sails at a moment's warning.

Tides.—It is high water, full and change, in Porto Praya at 6h.; springs rise about 5 feet.

Current.—North-west of St. Jago island the current frequently sets to the westward at rates of from $1\frac{1}{2}$ to 2 knots an hour.

RIBIERA GRANDE, or Santiago, is built in a cleft of the hills, 6 miles west of Porta Praya; in the fine season, anchorage may be obtained off the town in from 8 to 14 fathoms water, with the flagstaff of the fort in line with the flagstaff of the old episcopal palace.

Coast.—From Ribiera Grande to Ponta do Atum (Tarrafal point), the north-west extreme of the island, the coast is generally high; Tarrafal hill, east of (Ponta do Atum) is 2,150 feet above high water. On this coast there are a few indentations in which some houses are to be seen; the chief of these are known as Ribiera Prata and Ribiera Barca, situated respectively 8 and 11 miles south of Ponta do Atum; in both of these bights supplies of fresh water can be procured.

Tarrafal bay, about 4 cables in width and the same in depth, is situated immediately north-east of Ponta do Atum, which is high and steep; the general depths in the bay are from 5 to 9 fathoms, except within a cable of the shore, and anchorage may be obtained, in from 5 to 6 fathoms water, in the centre of the bay with Ponta do Atum bearing about W. $\frac{1}{4}$ S. The small village of Mangue is close to the south side of the bay, where there is a landing place.*

* See plan of Tarrafal bay; scale, $m = 4.7$ inches, on Admiralty sheet of plans, No. 369.

Supplies.—A small supply of fresh meat and vegetables may be obtained ; water is abundant.

Tides.—It is high water, full and change, in Tarrafal bay at 7h. 28m. ; springs rise 5 feet (approximate).

LIGHT.—On Ponta Preta, nearly $1\frac{1}{4}$ miles north of Ponta do Atum, a small iron structure, 19 feet in height, and painted red, exhibits, at an elevation of 111 feet above high water, a *fixed white* light, which should be visible in clear weather from a distance of 9 miles. The keeper's dwelling, painted white, is situated to the south-eastward of it.

Bighude point, the north extreme of the island, is rugged, and off the western part of it there are many isolated rocks.

The eastern side of St. Jago island forms at the northern part Malaguetas bay, an open bight. Puerto de Santiago, a cove about midway between the northern and south-eastern extremities of the island, may be recognised by its church and a group of palm trees.

FOGO ISLAND, nearly circular, and 43 miles in circuit, lies 30 miles west of St. Jago island ; it is the loftiest of the cape Verde islands, the principal peak, a symmetrical cone, situated at the north-east part, being 8,500 feet above high water ; it is, however, generally clouded. The inhabitants, which in 1895 numbered 20,009, are of Spanish origin.*

LIGHT.—At fort Carlotta a *fixed red* light is shown from an iron support, 10 feet in height, at an elevation of 116 feet above high water, which should be visible from a distance of 3 miles in clear weather. This light is to guide to the anchorage off Luz.

Anchorage.—Vessels may anchor off the town of Luz on the west side of the island, but the bottom is rocky and the water very deep ; there is generally a heavy surf on the beach, and landing is difficult.

The best anchorage is on the parallel of the town in 24 fathoms water, with the north entrance point of the bay, in which it is situated, bearing N. by E. $\frac{1}{2}$ E., and the north battery E. by N. $\frac{3}{4}$ N.

Supplies.—Fruit may be obtained in the season, but water can only be procured in small quantities.

Landing is very bad, and should only be attempted in native boats.

Note.—Vessels under sail should not approach closely the high parts of the island, for although a strong breeze may be blowing in the offing, light winds and calms often prevail near the land.

See chart No. 369.

* See chart No. 366.

Tides.—It is high water, full and change, at Fogo island at 6h. 15m.; springs rise about 5 feet.

Currents.—Off the north and north-east extremes of Fogo island the currents are strong and influenced by the wind.

BRAVA ISLAND.—The island of Brava, the south-western of the cape Verde group, is 15 miles in circuit, and lies $8\frac{1}{2}$ miles west of Fogo island. Off the north extreme of the island are situated two small islets. Brava is composed of high peaks, the highest, named Fontainhas, being 3,609 feet above high water, but they are generally enveloped in mist; the shores are steep and safe to approach, and although rocky and precipitous, safe landing may generally be effected at most parts. In 1895 the population of Brava was 9,842.

LIGHT.—On Jalunga point, the east side of Brava, a *fixed white* light is shown from an iron support, 10 feet in height, at an elevation of 50 feet above high water, it should be visible from a distance of 8 miles in clear weather, between the bearings of S. $\frac{1}{4}$ E., through west, to N.E. $\frac{1}{4}$ N. (225°).

Fajao D'Agua, on the north side of Brava, has anchorage in from 8 to 9 fathoms water, but the whole space is not more than three quarters of a cable, and small craft moor; there are also several anchorages for coasting vessels round Brava island, but generally difficult of access, and only affording supplies in limited quantities. The principal town is San Juan Bantista, which is near Furna cove, on the east side of the island, $3\frac{1}{2}$ miles north of the south extreme; it affords good anchorage to small vessels from November to July. Here there is a good sandy beach, with a village, provision stores, a custom house, and post office.

Commander M. Costa, of the Portuguese Government Advice Boat *Guaya*, reports that the swell does not enter Furna cove, which is capable of holding seven or eight vessels of moderate tonnage, with one anchor seaward and the stern secured to the shore.

Supplies.—Water is plentiful and may also be obtained from the river Fajao d'Agua; fresh provisions can be procured.

Pilots.—A pilot is ready when required.

Tides.—It is high water, full and change, at Brava island, at 4h. 10m.; springs rise $3\frac{1}{2}$ feet (approximate).

Rombos or Romes islets consist of a group of six rocky islets, Grande and Cima, the two largest, being each about 3 miles in circuit, lying in a W.N.W. and E.S.E. direction, 2 miles apart, but almost connected by rocks and islets. From the eastern islet the north-west extreme of Fogo

See plan of Fajao d'Agua, scale, m=4·7 inches, on Admiralty sheet of plans, No. 369.

bears E.S.E., distant 8 miles; and from the western and higher islet the nearest part of Brava is distant $2\frac{1}{2}$ miles, bearing S.S.W. There are several convenient ports for small vessels.

These islets are surrounded by deep water, but the ground between them is foul; clear channels exist between them and Brava island, also between the islets and Fogo.

See chart No. 366.

CHAPTER VIII.

RIVER GAMBIA TO ISLES DO LOS (IDOLOS).

 VARIATION IN 1900.

River Gambia	-	-	-	19° 15' W.
Isles do Los	-	-	-	19° 15' W.
Decreasing about 2' annually.				

RIVER GAMBIA.—The estuary of river Gambia may be said to extend from Sangomar (Punshavel) point to Cape Bald, a distance of 28 miles in a south-south-west direction; but at 7 miles east of this line it contracts to a breadth of 10 miles between Barrada creek (off which Bird Island formerly existed) and cape St. Mary, and to a width of little more than 2 miles between Barra point and the town of Bathurst, the entrance proper of the river.*

Immediately above the town the river again expands to a breadth of 7 miles; at Dog island point it is 4 miles wide, at Albreda 3, and at Muta point $1\frac{1}{2}$ miles, gradually diminishing from thence, till at MacCarthy's island it is not a quarter of a mile across. This island is about 150 miles above Bathurst, and though the course of the river is very tortuous, and divided by several islands, yet it is navigable the whole distance.

The banks of the river, covered with mangrove bushes, are of soft mud, rendering landing impossible except at the creeks or at the few villages on the banks.

Into the northern side of the estuary of the Gambia, four other rivers empty their waters, viz., the Salum, Jumbas, Fellane, and Jinnak; the two former are of considerable size, and bring down large quantities of silt and sand, by which Sangomar bar and Red bank are formed.†

Navigability.—Steamers load at MacCarthy's island to a draught of $13\frac{1}{2}$ feet, and a vessel of 10 feet draught with the aid of a pilot might proceed 70 miles beyond that island to Yambutenda; the river is navigable for another 80 miles.

* See Admiralty chart :—Africa, West coast, Sheet VI., cape Verde to cape Roxo, No. 599; scale, $m = 0.14$ inch; also Admiralty chart of river Gambia, in 3 sheets, Nos. 608, 609, 610; scales, $m = 0.8$ inch.

† See Admiralty plan :—Salum and Jumbas rivers, No. 607; scale, $m = 0.95$ inch.

Salum river, an arm of the sea about 75 miles in length is connected with the Jumbas and Gambia rivers by creeks. The custom house, situated about a mile north of Sangomar point, is a solitary house with a flagstaff, standing amongst trees about 100 yards from the bank of the river. The villages of Niojor and Dionó uar are situated 2 and 4 miles respectively on the left bank within the entrance.

Sangomar bar may be said to lie across the mouth of the Salum river, in a south-south-west direction for a distance of about 7 miles from Sangomar point to South or Jumbas bank ; it is dangerous to cross in boats.

Entrances.—Between Sangomar point and South or Jumbas bank the river is entered by three passes. The North pass, which has a south-east direction towards, and passes close round, Sangomar point, has a depth of about 3 feet at low water, spring tides, and is available at high water for small coasting vessels, but the tidal streams run very strongly.

The West pass, entered about mid-way between Sangomar point and South or Jumbas bank, has a depth of 7 feet, but should not be used without being previously buoyed.

In 1898 the South pass, the principal entrance, was about three-quarters of a mile in breadth at the entrance, gradually narrowing, in a north-east direction, for 2 miles, with a general depth of $3\frac{1}{4}$ fathoms ; thence the channel turned sharply to the north-west crossing the bar with a least depth of 7 feet at low water.

As spring tides rise 6 feet, vessels of considerable burden might load with facility in Salum river, but it should be remembered that the bar is subject to constant change. Between the three passes the banks, composed of sand, dry in places and break heavily with any sea. When past the bar the depths increase to 4 and 6 fathoms, but east of Sangomar point, a bank about a mile in length with a least depth of 9 feet, occupies the western side of the river ; the anchorage is north-west of this bank, off the Custom house.

CAUTION.—Strangers should not attempt to enter without a pilot.

Buoys.—The entrance to the Salum river is continually changing and temporary buoys may be found laid down, but they are generally small and not to be relied on. *See Caution ; buoyage, page 33.*

From the last report, the positions and colours of the buoys were as follows :—

An outer buoy, painted black, and surmounted by a staff and ball.

A buoy, painted black, and surmounted by a staff and ball, on the north side of the entrance to South pass.

The channel in the river was marked by buoys, red on the starboard and black on the port hand entering.

Sangomar point to Fundiun.—From Sangomar point, the river has a northerly direction for 8 miles with flats, which dry, extending half its breadth from the eastern bank, and about one mile north of Dionó uar is the entrance to Gokhor creek, which under the name of Falia creek, connects with the river at the village of Guirnda, about 10 miles to the north-east; the least depth in the creek is $10\frac{1}{2}$ feet at low water, spring tides.

At 3 miles north of Gokhor creek on the western bank, there is a large red sand dune, quite bare, and visible from a long distance seaward; and from this dune an extensive bank commences and fronts the bank of the river, the channel, with depths of from $5\frac{1}{2}$ to $7\frac{1}{2}$ fathoms water, lying on the eastern side.

From the red sand dune the river turns to the north-east for 5 miles, and on the north bank is the entrance to Guilor Didiak creek, off which a bank, with 9 feet water over it, lies in the centre of the river with channels on either side. The river then bends to east-south-east for 3 miles to three green islands, named Diable islands, and the banks on both sides are bordered with mangroves, the channel lying on the northern side. There is a channel, with a depth of $3\frac{1}{4}$ fathoms, between the two western Diable islands, but the deeper channel lies altogether to the southward of them.

From Diable islands the river has a north-east direction for 12 miles to Fundiun; at 2 miles the channel, with $5\frac{1}{2}$ to $6\frac{1}{2}$ fathoms water, lies between Fambine and N'dar banks, both of which uncover at low water. At 7 miles the river is encumbered by Tiaré bank and the navigable channel is on the northern side.

On the right bank the Salum river receives the Siliff river and the Sin, on which latter is the town of Fatik, 10 or 12 miles from the junction. The navigation of Siliff river is difficult, but it is frequented by schooners and coasting vessels which load with ground nuts and millet, and from 16 to 19 feet water may be carried so far as Siliff village, about 10 miles from the entrance.

Fundiun.—About 30 miles above Sangomar point, and 35 miles from the bar, on the left bank, opposite the mouths of Siliff and Sin rivers, is the French trading factory of Fundiun.*

The native chief is subject to the King of Sin, a territory northward of the Salum; the King's residence is on the right bank of Sin river.

The native town is well laid out, and there are a few Europeans, all traders.

See chart No. 607.

* *See plan of Fundiun; scale, m = 1.9 inches on Admiralty chart No. 607.*

Communication.—There is telegraphic communication with St. Louis from the opposite bank of the river; and a road to Fatik where there is also a telegraph station, postal communication every few days, and water communication by sailing cutter.

Anchorage.—The anchorage at Fundiun commences at the mouth of the river Siliff, the depths being from 19 to 23 feet over good holding ground; here the Salum river is nearly a mile in breadth.

Kaolack, a town situated 75 miles from the sea, near the head of Salum river, can be reached by vessels of 8 feet draught; the village of Kahone, 2 miles east of Kaolack is the residence of the King of Salum.

Anchorage.—Kaolack exports quantities of ground nuts, and vessels moor in a depth of 16 feet at low water, close to the south bank of the river.

Above Kaolack the Salum is only navigable for small boats.

Supplies.—Very few supplies can be obtained, but if notice be given they may be procured in small quantities; fresh water is scarce, but it may be obtained by digging on the Sangomar peninsula at the entrance, and sometimes at Kamakan on the left bank between Fundiun and Kaolack, and it is sold at Fundiun at 10 centimes per litre.

Trade on the river Salum is considerable, ground nuts are said to be cheap and of excellent quality: silver coin is used.

Tides.—It is high water, full and change, at the entrance of Salum river at 8h. 10m.; springs rise $5\frac{1}{4}$ feet. High water at 11h. 10m. at Fundiun; springs rise about $4\frac{1}{4}$ feet; in the month of April the spring rise was observed to be 6 feet. High water at Fatik at 5h. 10m.; springs rise $1\frac{2}{3}$ feet.

At Kaolack it is high water, full and change, at 6h. 5m., the rise and fall of tide is about $3\frac{1}{4}$ feet.

Tidal streams.—The tidal streams run very strongly on the bar and in the narrow parts of the river, the stream of both flood and ebb continuing from 2 to $2\frac{1}{2}$ hours after high and low water, during which period there is no appreciable rise and fall until the stream turns. The flood tide entering at West pass sometimes attains a velocity of 3 knots an hour, and splits after crossing the bar; one stream having a northerly direction towards the Salum river, the other, setting south-east, towards the entrance of the river Jumbas.

Bird island bank (Red bank).—This extensive bank fronts the shore between Sangomar bar and Buniada point, a distance of 18 miles; its western extremity lies nearly 6 miles from the shore. The intermediate coast is low, and intersected by the mouths of the river Jumbas and Banjala and Jinnak creeks, being fronted by several very shallow ridges and knolls, some of which dry at low water.

See chart No. 607.

Jumbas river.—The entrance to the Jumbas river, about 5 miles in width, lies between Jackonsa and Bird island points, and is difficult of access owing to the extensive banks which extend seaward.

About 4 miles within the entrance the river is divided into two channels by Jum or Jifandur island, covered with mangroves, and which has a bank, drying in places, extending for 7 miles in a south-west direction to south or Jumbas bank; Germano island, small, wooded and 3 miles south-west of Jum island, lies on a drying portion of the above-mentioned bank.

Main pass, between Jackonsa point and Germano island, is the channel used, but it would be necessary to buoy it before entering.

About a mile east of Jum island is the entrance to Sangako creek, which communicates with the Salum river, joining it south of Fambine bank, the channel here having a least depth of 13 feet; Sangako creek is navigable for small steam-vessels.

Tidal streams.—The flood streams of the Salum and Jumbas rivers meet in Sangako creek about midway between the two rivers.

Banjala creek.—The entrance to this creek lies between two banks of sand and mud, and over a bar, extending $2\frac{1}{2}$ miles seaward, which breaks heavily; it may be passed, by vessels drawing 9 feet water, when the sea is smooth outside it, but at other times it is most unsafe.

Inside the bar the water deepens to 5 and 7 fathoms, and the creek, which is navigable for small steam-vessels, communicates with the Jumbas river, which it joins at about 5 miles east of Jum island.

The village of Bétenti is situated on the north bank, 3 miles within the entrance, here there is a landing place. Messira, another village, is on the south bank about $2\frac{1}{2}$ miles east of Bétenti, and there are several other villages near the banks of the creek.

Tidal streams.—The flood stream ascends Banjala creek to Sandikoli creek and there joins the flood stream of Jumbas river.

Jinnak creek is entered about 3 miles south of Banjala creek and joins it about a mile west of Messira. The bar is rather rough, even in fine weather, and with comparatively smooth water in the estuary. The village of Jinnak is situated on the south bank, about a mile within the entrance.

Bird spit, absolutely “steep-to,” and lying very near the fairway track up the Gambia, is a very dangerous spot at the western extremity of Bird island bank, the soundings suddenly decreasing from 4 fathoms to 4 feet; the shoalest part, which nearly dries at low water, lies W. by N. $\frac{3}{4}$ N., distant $6\frac{1}{2}$ miles from Barrada creek.

CAUTION.—Bird island bank (Red bank) is especially dangerous to approach during the harmattan season, because when estimating distances from the shore the haze makes it appear further off than it really is. Soundings are no guide as in many places the edge of the bank rises abruptly from a flat of 4 fathoms to less than one fathom, as at Bird spit.

Depths off shore.—In approaching Gambia river direct from seaward, on the parallel of $13^{\circ} 33' N.$, the depth of 100 fathoms, over fine dark sand, will be found at 50 miles west of Cape St. Mary; there are 20 fathoms at the distance of 30 miles, and 10 fathoms at 18 miles west of the cape, at which latter distance, if the weather be clear, the tops of the trees will be just discernible.

When the depth decreases to 6 fathoms, the vessel will be 12 miles from cape St. Mary, and the same distance from cape Bald, when in clear weather the land about them should be seen. The general depth between this position and African knoll is $4\frac{1}{4}$ to 5 fathoms, but two shoals of 4 fathoms exist, as also small banks with $2\frac{1}{2}$ and $2\frac{3}{4}$ fathoms water over them, lying nearly 2 miles westward of African knoll. As a general rule, the nature of the bottom on the northern side of the entrance to the Gambia is mud, and that on the southern side is sand, or sand and mud mixed.*

DANGERS.—**Horse-shoe bank**, the north-western danger at the entrance of the Gambia, is reported to have only 12 feet on some parts of it. The bank is convex at its south-west extreme, from which cape St. Mary bears S. $\frac{3}{4}$ E., and African knoll S.E. $\frac{1}{2}$ E., each distant 8 miles.

Bijol islands, situated about $1\frac{3}{4}$ miles north-west of cape Bald, are two small islands, covered with grass, and surrounded by reefs of rocks, which extend 2 miles west of them, and on which the swell always breaks. Some of these off-lying rocks uncover at half-ebb, and there are depths of 2 and 3 fathoms at a quarter of a mile from their western extreme, which bears W. by S., distant $13\frac{1}{4}$ miles from cape St. Mary, and 4 miles N.W. by W. $\frac{3}{4}$ W., from cape Bald; the coast between Bijol islands and cape St. Mary is fronted by sunken reefs, extending in some places a considerable distance from the shore.

St. Mary shoal is a narrow shallow bank, extending $5\frac{3}{4}$ miles in a N. by W. direction from Bathurst. Between St. Mary shoal and the north side of St. Mary island the water is shallow. A shoal, on which the depth is about 15 feet, lies three-quarters of a mile north of the north extreme of St. Mary shoal, with African knoll buoy bearing E. by N., distant $2\frac{1}{4}$ miles; and a shoal, having a depth over it of $2\frac{3}{4}$ fathoms, lies

* See Admiralty chart: River Gambia entrance, No. 608: scale, $m = 0.8$ inch.

on the edge of the channel, with African knoll buoy bearing E. $\frac{1}{4}$ S., distant 2 miles.

African knoll, the northernmost of the shoals which lie off the south entrance point of the Gambia, has from 15 to 20 feet water over it; it is 3 cables in length, in a north-west and south-east direction, and $2\frac{1}{2}$ cables in breadth; the main channel of the Gambia between the 5-fathoms lines on either side is here 8 cables wide, the narrowest part being between the knoll and the flats off Jinnak creek, in a N.E. direction.

Middle ground consists of two banks, each having a depth of 15 feet, situated between St. Mary shoal and African knoll; the northern is about 7 and the southern about 5 cables in length, and there are passages on either side, and between them, which should only be used by local craft.

Buoys.—**Fairway bell buoy**, black and white chequered, and surmounted by a staff and cage, lies in a depth of $4\frac{3}{4}$ fathoms, with cape St. Mary (centre of red cliff) bearing S.E. $\frac{3}{8}$ S. distant $8\frac{1}{10}$ miles, and Middle buoy E. by S. $\frac{2}{8}$ S., distant $5\frac{1}{2}$ miles.

Middle buoy, conical and painted red, lies in $4\frac{1}{4}$ fathoms water, with cape St. Mary bearing S. $\frac{1}{4}$ E., distant 5 miles, and African knoll buoy E. by S. $\frac{7}{8}$ S., distant $5\frac{3}{4}$ miles.

African knoll buoy, conical, painted black, and surmounted by a cage, lies about 3 cables east-north-east of the African knoll, in about 9 fathoms water, with the northern point of Jinnak creek entrance bearing E. by N. $\frac{1}{2}$ N., and the east extreme of Bathurst point S. $\frac{1}{2}$ W.

Inner Buoy, is conical, painted white, and surmounted by a staff and cage from it the east extreme of Bathurst point bears S. $\frac{3}{4}$ W., distant $3\frac{1}{2}$ miles.

CAUTION.—The buoys often break adrift, and are not to be depended on, either for positions or colours. *See* Caution; buoyage, page 33.

CAPE ST. MARY, the north extreme of the western entrance point of the estuary of Gambia river, bears from Sangomar point S. $\frac{1}{2}$ W., distant 22 miles. Foul ground extends east and west of the cape, but at 2 miles N.N.W. from it there is a depth of 5 fathoms. The cape, about 60 feet above high water, composed of red cliffs, and capped by cocoa-nut trees, and with a white house to the westward, used as a sanatorium, may be recognised at some considerable distance; but on the northern side of the entrance to the river, where the coast is covered by bush, there is, as a rule, nothing to distinguish it but the larger trees in the mirage.

Landing.—During the rainy season landing can be effected on the sandy beach southward of cape St. Mary; at other seasons the breeze sets in fresh from the sea, creating a surf that renders landing unsafe.

Outer anchorage.—If the buoys cannot be made out, a vessel should anchor, in 5 fathoms water, off the Sanatorium on Cape St. Mary, and, if necessary, send a mounted messenger to Bathurst for a pilot.

BATHURST.—From cape St. Mary the coast trends, in a south-easterly direction, for a distance of 6 miles, terminating in a sandy point that forms the western entrance point of the Gambia, and on which is built the town of Bathurst, founded in 1816. Midway is the entrance to Oyster creek, which, communicating with the river 3 miles to the westward of Bathurst, forms the island of St. Mary. An iron bridge crosses the creek.*

The European houses are large and surrounded by gardens; those of the natives are small and thatched; the Administrator for the colony of Gambia resides here, and the population is estimated at 6,000 inhabitants.

A botanic station was established in 1894.

Barra point (on which fort Bullen is built), is the eastern entrance point of the Gambia, and may be recognised by a conspicuous clump of trees; it bears from Bathurst, its western entrance point, N.E. $\frac{3}{4}$ E. distant $2\frac{1}{2}$ miles; on that line the navigable part of the channel is $1\frac{1}{2}$ miles wide. Barra point bears from Sangomar point S. $\frac{3}{4}$ E. distant 25 miles.

Communication with London once in three weeks; Liverpool every alternate Saturday; during the ground-nut season steamers are more frequent. A small steamer runs to MacCarthy's island every week. Four lines of telegraph connect the settlement with England and ports on the west and south-west coasts of Africa; also with cape Verde islands. There are no railways.

Supplies.—Beef and fowls and vegetables of fair quality may be procured; bread is very good, but fruit is usually scarce. The water at Bathurst is brackish, and only suitable for washing purposes; a moderate supply may be obtained in ship's breakers from a well at the house of the Collector of Customs, but a better quality is procurable at Jillifri, 16 miles above Bathurst, on the right bank of the river; vessels fitted with condensers are recommended not to use the water from the shore. Fish are very abundant at the north side of the entrance. Cordage and canvas are procurable. French silver coins are mostly used.

Coal.—A small quantity of coal can generally be obtained from the French Company, who keep about 200 tons in stock, but this supply is uncertain; no coal can be obtained from any other firm. Ships unable to go alongside their pier are coaled by iron lighters holding from 10 to 35 tons, the coal being in bags; the coal store of the French Company is situated at their pier near the centre part of the town. The French Company can also obtain it in trading schooners from Dakar. A small

See plan of Bathurst, scale, $m = 6$ inches, on chart No. 608.

supply of patent fuel may be obtained from the Bathurst Trading Company.

Piers.—There is a substantial iron T pier, 138 feet in length, built by the Government, the T head, which will accommodate steamers drawing from 17 to 20 feet alongside, is 215 feet in length; the pier has tramways on it, but no crane. Ships drawing from 12 to 15 feet water can go alongside the French Company's pier.

There are some frail wooden jetties extending from the shore off Bathurst, alongside which small vessels lie to discharge or take in cargo. The more important of these have tramways leading to warehouses; there is also a small crane capable of lifting about a ton weight. The depths alongside these jetties are from 12 to 19 feet at low water, spring tides, but are reported to be decreasing.

LIGHTS.—On each extreme of the T head of the Government pier a *fixed red* light is exhibited. These lights are provisional.

Buoy.—A buoy, for warping, is moored about three-quarters of a cable, E.N.E., of the T pier.

Hospital.—There is a hospital for sailors.

Pilots.—The pilot service has been discontinued.

Trade.—The exports are ground nuts, india-rubber, hides, and bees-wax; the imports, cottons, tobacco, firearms, gunpowder, spirits, kola nuts, and general imports. In 1898 the value of the exports was 245,110*l.*, and imports 187,062*l.*

There is a Custom house and a quarantine establishment.

Anchorage.—A good berth for vessels of war, without the influence of the whirl of the tidal stream, is in 10 fathoms water, over mud, with the south end of the town of Bathurst bearing W. by N. $\frac{1}{2}$ N., : eastern end of the town N. $\frac{5}{8}$ E., and Barra point clump N.E. $\frac{1}{8}$ N.; or about $1\frac{1}{2}$ cables south-east of the T pier in 12 fathoms water. A berth may be taken up northward of Government House, about 2 cables off shore, near St. Mary's shoal, in 7 fathoms water, with fort Bullen bearing N.E. by E., and the east extreme of Bathurst bearing S.S.W. A vessel should either moor, or lie with a long scope of cable, as the constant swinging makes a foul anchor almost a certainty, if riding with little chain out.

Easterly winds sometimes raise a heavy sea on the ebb tide.

Directions.—The best parallel on which to approach the entrance of the Gambia is either $13^{\circ} 30' N.$ (that of cape St. Mary) or $13^{\circ} 34' N.$ (that of the fairway buoy); the land about cape St. Mary is quite distinct in character from the other portions of the coast, and higher. The northern Bijol island, which makes as two clumps, one of dense bush, the other of high trees, is a conspicuous mark, as is also a tree at the village of Tuyure.

If cape St. Mary is made, and the Sanatorium distinguished, there need be no difficulty in picking up African knoll buoy without a pilot, as the vessel's position can be placed on the Admiralty chart by bearings of cape Bald, cape St. Mary, Bathurst and Barra points, and the entrance to Jinnak creek.

The coast is generally very low, and there is no good natural mark that would justify a stranger, in a sailing vessel, proceeding beyond African knoll buoy, without a pilot or some local knowledge.

From the northward.—After passing cape Verde, bring cape Manuel lighthouse to bear N. $\frac{1}{4}$ W., and maintain a S. $\frac{1}{4}$ E. course, allowing for the current according to the season of the year (*see* page 48); the soundings should be frequently verified, and the depth not decreased to less than 10 fathoms till near the parallel of $13^{\circ} 34' N.$, when the entrance should be made from the westward.

From the southward.—The great dangers in making Gambia river from the southward are the Bijol islands, but the land adjacent to them being high, and the northern Bijol island conspicuous, a good estimate may be formed of its distance, and by not reducing the depth of water to less than 6 fathoms, a safe distance from the rocks will be ensured.

After passing cape Bald and Bijol islands, a position north of cape St. Mary should be sought, from whence measures could be taken to enter the river, or to anchor and obtain a pilot; in hazy weather with an ebb tide, great care will be necessary to prevent being set too far towards Horseshoe bank. In passing westward of Bijol islands, if the flood stream is running, the soundings should not be decreased to less than 8 fathoms.

If the buoys are in position and can be made out, there is no difficulty in entering or leaving the Gambia, without a pilot, in a steam-vessel of moderate draught; a vessel of over 24 feet draught should if possible take a pilot, as in consequence of the heavy rains bringing so much deposit down the river, the shoals vary in their positions, and the depth of water over them is often somewhat different from that shown on the Admiralty chart.

After rounding African knoll on the north side, keep a mid-channel course for Bathurst steering S. $\frac{5}{8}$ W. and making due allowance for set of tide, especially at springs, but the water should not be shoaled under 6 fathoms. During the greater part of the year, when the trade-wind blows from N.W. and N.E. a vessel may enter under sail, and vessels of war, of 10 feet draught, find no difficulty in beating in or out, with a favourable tide.*

CAUTION.—On no account should an attempt be made to enter the river, without a pilot, until African knoll buoy is made out, and it should be borne in mind that the flood sweeps rapidly past Bathurst; also that both ebb and flood set towards African knoll and Middle ground.

See charts Nos. 599, 608.

* *See* view on chart No. 608.

Tides.—It is high water, full and change, at Bathurst at 9h. 10m., but the stream continues to flow $1\frac{1}{2}$ hours after the tide has ceased rising by the shore; springs rise $6\frac{1}{2}$ feet to 9 feet during freshes at the period of rains, neaps 5 feet; neaps range 3 feet.

Tidal Streams.—The velocity of the tidal streams vary, and frequently without any apparent cause. The ebb stream, diverted by Barra point, sets strongly down upon St. Mary shoal, while the main stream runs over Middle ground. In mid-channel, west of African knoll, the ebb stream sets directly to seaward; but near the northern shore it is variously affected by the tide from the creeks, and from the rivers Jumbas and Salum, before they unite and take the general direction of the coast.

Gambia River above Bathurst. — South bank.—Southward of St. Mary island extensive shoals, extending 2 miles from the shore, front the entrance of Lamin creek, which is supposed to communicate with Mandina creek, the entrance to which is $5\frac{1}{2}$ miles to the southward; here the bank of shoal water also extends about 2 miles from the shore.

From the entrance to Mandina creek, the south bank of the river has a south-easterly direction, for 8 miles, to the entrance of Kafuta or Faraba creek, it then trends more to the eastward for $13\frac{1}{2}$ miles to the entrance of Vintang creek; at 5 miles from Kafuta creek is the entrance to Beréfet creek, and between, the shoal water is generally from 1 to $1\frac{1}{2}$ miles from the south bank.*

Vintang creek.—Vintang creek is navigable, from its entrance, to Sandeng (a distance of 41 miles) for a vessel drawing 9 feet, at any time of tide, and, by crossing certain places at high water, a vessel drawing 13 feet might reach Sandeng, but would find difficulty in turning there if exceeding 150 feet in length. The deepest channel is, as a rule, in the centre of the creek, and varies from 10 feet in the broad places to 10 fathoms in the narrow.

There is very little trade in Vintang creek, and the people have few canoes; from Kansala to Bondali, a distance of 18 miles, not even a hut was seen; at Bondali the creek is about 70 yards wide.

Mosquitos and sandflies render it almost impossible for any white man to sleep without a mosquito net.

Supplies.—Supplies are very scarce at Kansala, a few fowls and eggs can be obtained occasionally.

Anchorage.—Vintang $2\frac{3}{4}$ miles, and Kansala 13 miles from the entrance, are circular stockaded villages with small cultivated areas round them. There is a short pier for landing at Kansala.

* See Admiralty chart :—River Gambia, sheet II., No. 609; scale, $m = 0\cdot8$ inch.

Antelopes, hares, bush fowl, sand grouse, and plover plentiful. Bush turkeys seen occasionally, curlew may also be shot.

At Kansala vessels should anchor towards the northern bank, as a shoal extends off the town.

In January 1892, *H.M.S. Sparrow*, drawing 13 feet 3 inches, proceeded 7 miles above Kansala, the least depth obtained, at low water, being 16 feet, and anchored off the second large clearing on the southern bank, known as Sangajor wharf, having just room to swing.

Directions.—The channel leading to Vintang creek is between two shoals, nearly dry at low water, extending about half a mile off each entrance point, and has not less than 17 feet at low water, spring tides, but the periodic rains cause this channel to shift, and no vessel drawing more than 12 feet water should attempt to enter without having previously buoyed the channel; at low water and with the sun in a favourable position, the shoals at either side of the entrance show distinctly.

The entrance should be approached from the westward, with fort James astern, bearing W. by N. $\frac{1}{3}$ N., which bearing clears the shoal extending from Vintang point, and when that point bears S.S.E. $\frac{1}{4}$ E., the entrance of the creek should be steered for, and a conspicuous point, also on the southern bank, will come in line with Vintang point; when in the creek, the course is in mid-channel, and the northern bank should not be approached until well in the creek.

The banks of the creek are low and, except near the villages of Vintang and Kansala, covered with high mangroves, apparently extending back for some distance. Leaving Bathurst at three-quarters flood insures carrying the flood tide as far as Kansala.

Tides.—It is high water full and change at Kansala at Oh. 5m.; springs rise 6 feet, neaps 3 feet; the greatest rate of the stream observed was $2\frac{1}{2}$ knots: the tidal streams continue to run about one hour after high and low water. It is high water at Sandeng 3 hours later than at the entrance of the creek; springs rise 5 feet, neaps $3\frac{3}{4}$ feet.

Continuation of South Bank.—From the entrance to Vintang creek the south bank of the Gambia trends, in a north-east direction, for 8 miles to Muta point, at 5 and $6\frac{1}{2}$ miles respectively are the entrances to Janekunda and Kiong Manila (Butain) creeks, both very small.

Muta point, the northern extremity of this part of the south bank, has a sand spit lying about 2 cables eastward of it, and a very conspicuous cocoa-nut palm S.S.W. $\frac{1}{2}$ W., distant about two-thirds of a mile from the point. From Muta point the south bank takes a south-east direction for $5\frac{1}{2}$ miles to Tankural, a village in a large clearing close to the

water's edge, the land near having a park-like appearance when approaching from the westward; here shoal water extends at least half a mile from the shore.

The bank of the river now takes a more easterly direction, and at $15\frac{1}{2}$ miles distant is the village of Tendebe, situated in a clearing, close to a low point, and having two cotton trees, one on the point, the other 2 cables to the eastward.

So far as Tendebe vegetation extends generally to the shore, but clearings and park-like patches are numerous. On this bank of the river there is, at 6 miles from Tankural, the entrance to Jarin creek, off which a bark extends about a third of a mile, and 3 miles eastward is the commencement of a shoal, fringing the river bank for a distance of about 3 miles, which is reported to extend about half a mile off with 2 fathoms water. Eastward of this shoal, and near the abandoned town of Tubabkolong, are some rocks dry at low water, and another cluster, also dry at low water, lie in a bight between Tubabkolong and Tendebe; about a mile north-west of Tendebe, and in mid-channel of the river, there is a patch with $2\frac{1}{2}$ fathoms water over it.

Tides.—It is high water, full and change, at Tankural at 11h. 50m. and at Tendebe at 12h. 10m. (approximate).

Elephant island.—From Tendebe the south bank of the river has an easterly direction for $7\frac{1}{2}$ miles to Krule point; for the last two miles of this distance the water is shoal for about a third of a mile off shore, and is reported to be extending to the northward, as in 1899 H.M.S. *Alecto* found 10 feet water nearly in mid-channel of the river, with Krule point bearing S.W. by W. $\frac{3}{4}$ W. distant one mile. After passing Krule point there are several bends, also small creeks, on the south bank for $21\frac{1}{2}$ miles to Elephant island, which, nearly 4 miles in length by $1\frac{1}{3}$ in breadth, divides the river into two channels, the southern being the wider.

North of Elephant island the river turns with a bend to the westward and then north-north-east to Balangar, on the north bank, 13 miles from Elephant island. From abreast of Balangar the south bank bends round to the east and south-east for $6\frac{1}{2}$ miles to Pappa islands.*

Pappa islands, two in number, low and marshy, lie off the south bank of the river, and are divided from each other, by a small creek 4 cables in length, which has, on the river side, a breadth of about one-fifth, widening out to more than half a cable.

Pappa creek, with varying breadths of from three-quarters to 2 cables and depths of from $1\frac{1}{2}$ to $6\frac{1}{2}$ fathoms, has an entrance at either extreme of the Pappa islands. The western entrance is about a cable in

See chart No. 609.

* See Admiralty chart:—Gambia River, sheet III., No. 610; scale, $m = 0.8$ inch.

width; the eastern, contracted by shoal water extending from its entrance points, about three-quarters of a cable.

Tidal streams.—The tidal streams run strongly in and out of the creeks, and great care and caution is requisite.

Alecto hill, about 100 feet high, thickly wooded and very conspicuous, is situated about half a mile to the southward of the western entrance to Pappa creek.

Llewelyn island, about $1\frac{1}{2}$ miles south-east of Alecto hill, is about a mile in length; off its east extreme a bank uncovers at low water, and when passing it the south shore should be kept aboard.

Jarreng creek, about $2\frac{1}{2}$ miles eastward of Llewelyn island, has a very narrow entrance, is only navigable for canoes, and has the best water in mid-channel.

Mansa Kila islet, half a mile north east of Jarreng creek, is about a quarter of a mile in length, and has a bank extending from its western extreme, to avoid which it is necessary to keep on the north side of the channel.

Daresalama creek, about 40 yards wide at its entrance, is navigable for cutters for a distance of nearly 4 miles; the depths are from $1\frac{3}{4}$ to 3 fathoms, and in some parts it is about $1\frac{1}{2}$ cables wide. Its banks are lined by mangroves, behind which is a marsh with a few high trees and plantations extending about a quarter of a mile inland; this creek is supposed to connect with Kudang creek south of Deer island. It extends in an east-south-east direction for $2\frac{1}{2}$ miles from Mansa Kila islet, at the entrance, and then turns to the north-east, and at $3\frac{1}{2}$ miles from the entrance there is a conspicuous tree, on the north bank, off which the cutters usually anchor; canoes can proceed some distance further, but the creek narrows quickly and is overgrown in places.

The approximate positions of the stockaded villages of Satakoi and Kudang are $1\frac{1}{4}$ and 3 miles respectively, E. by S., from the bend of the creek to the north-east.

Deer islands, two in number, are low and marshy, wooded in parts, and divided by a channel, not used, but $3\frac{1}{2}$ cables in width. These islands divide the main river into two channels, the southern of which is alone navigable; it is low and marshy on both sides, with mangroves and thick bushes, and about a mile inland on the south side has some cultivated, also thickly wooded land. A shoal extends from the eastern point of the Western Deer island, and here it is necessary to keep on the south side of the channel.

Kudang creek, south of the Western Deer island, has an entrance nearly a third of a mile wide, but is only navigable for about three-quarters

of a mile, being overgrown with bushes beyond that distance; there is a landing place on the south bank, about half a mile within the entrance.

North bank of the river.—Dog island point, 6 miles south of Bathurst, is low and covered with bush, and has a thick cluster of trees rising about a quarter of a mile inside the point; the west extreme of the small islet, off the point, has trees on it, the east extreme only bush.*

The shoal ground, south of Dog island point, has extended, and its south-west edge, with 7 feet on it at low water, spring tides, lies with Dog island point bearing N.N.E. $\frac{1}{4}$ E., distant $1\frac{4}{5}$ miles, and fort James S.E. by E. $\frac{1}{2}$ E. From this edge, the shoal ground, composed of rock and mud, curves northward towards Dog island point, and extends in a S.E. by E. direction, with depths of 5 to 24 feet, for about one mile.

Lamin point is low and dark, with a large clearing half a mile to the westward.

Albreda makes as a low point with several white houses on it, and is easily distinguished by them, and by a house with a flight of steps facing to the southward, close to the point, and surrounded by a thick clump of fine silk cotton trees. Patches, with depths of 3 fathoms, lie about a mile south and south-west of Albreda.

Directions.—To anchor off Albreda, when the western white house bears N.N.E. steer for it, and anchor in $4\frac{1}{4}$ fathoms water; there is said to be a good berth more to the eastward in a depth of $4\frac{1}{2}$ fathoms.

Tides.—It is high water at Albreda at 10h. 30m. (approximate).

Fort James is the ruin of an old fort surrounded by small trees, on an islet lying S.E. $\frac{3}{4}$ S., distant $1\frac{2}{3}$ miles from Albreda.

Tudor or Seka point lies $3\frac{1}{2}$ miles eastward of fort James; Seka village is about $1\frac{1}{4}$ miles north-west, and the entrance of Sami or Joba creek nearly one mile to the eastward of the point; from this the north bank has an east-north-east direction, for 11 miles, to the entrance of Suara creek; midway is the entrance to Jurunka creek, off which a bank extends for probably more than half a mile.†

Suara creek is faced at the entrance by a large triangular shaped mud bank, one side of the triangle, nearly 2 miles in length, lying parallel to the shore, from which it is distant one mile. The entrance to the creek, about $1\frac{1}{2}$ cables in width, lies between this mud bank and the northern shore.

The creek extends about 16 miles to Contango, with a general breadth of 150 yards for 10 miles, and a least depth of 20 feet to Jien creek, on the left bank. Above Jien creek there are shoal patches of 6 feet, the creek gradually narrowing to 20 yards in Contango creek. About 4 miles from the entrance, on the south bank, there are traders' houses and a landing place.

* See chart No. 608.

† See chart No. 609.

Mendora creek.—From Suara creek the north bank has a general east-south-east direction for 14 miles to Mendora or Manoika creek, which has a shoal extending off it for some distance into the channel; the entrance to this creek is not very conspicuous, and for about a mile on either side of it there are high mangroves. From Mendora creek the north bank has still an east-south-east direction to Kashan point, a distance of nearly 12 miles; between are four creeks, the entrances to which are completely covered by high mangroves.

From Kashan point the north bank has an easterly direction and then curves sharply round to the southward to Devil point, the distance being nearly 10 miles. Midway is the entrance to Jurong creek, and between it and Devil point there are some very high mangroves.

Jurong creek, half a mile to the eastward of a large clearing, is about 300 yards wide at the entrance, but soon becomes narrow and winding. It is navigable at high water by a steam-boat for about $3\frac{1}{2}$ miles, to the landing place at Jurong. A shoal dries off the east point of the entrance for 70 yards at low water. There is a depth of one fathom 30 yards from the west point of the entrance, and a depth of 10 to 12 feet between the points.

Tides.—It is high water, full and change, in Jurong creek, at 1h. 10m. (approximate).

Devil bank, composed of sand and mud, edges the whole of the shore between Jurong creek and Devil point, being distant about 2 cables from the entrances of the creek; it gradually curves off the land, from which in the bight, and W. by N. $\frac{1}{2}$ N. from Devil point, it extends for a distance of about $1\frac{1}{4}$ miles; this bank, which appears to have grown up considerably since the last survey of the Gambia, is now reported to be extending to the southward, and in 1894 the mark for clearing, passing to the southward, was Devil point, bearing E. $\frac{3}{4}$ N.

From Devil point, high and “steep-to,” the distance is $17\frac{1}{2}$ miles to the west extreme of Elephant island, from which the distance is about the same to Balangar.

Balangar, a village and trading station, has three wooden piers, at which steamers can go alongside, north of the village. Balangar hill, 158 feet high, is wooded, and situated about $1\frac{1}{2}$ cables from the bank.*

Kaua creek, nearly 3 miles east-north-east of Balangar, is only navigable for canoes; the entrance is narrow and difficult to distinguish. Kaua hill, close to the eastward of the creek, is 180 feet high and thickly wooded. Bantanta creek, about $2\frac{1}{2}$ miles south-east of Kaua creek, is about a cable wide at its entrance and navigable for small trading cutters.

West Nianija creek, 7 miles from Bantanta creek, has high bushes and mangroves on its west bank, but the east bank is low; this

See chart No. 609.

* See chart No. 610.

creek is reported to be navigable for some distance, and is much used by canoes bringing produce to trading cutters anchored off its mouth.

East Nianija creek, 3 miles eastward of the West creek, has an entrance about $1\frac{1}{2}$ cables wide, and is navigable for canoes, but it is not so much used as the West creek. Between Bantanta and East Nianija creeks the land is low and marshy, with mangroves, but about half-a-mile inland it is thickly wooded.

From East Nianija creek, northward of Deer islands, to Nianimaru the distance is about 11 miles, but this channel, northward of the islands, is not navigable.

Nianimaru, a large village, is about $1\frac{1}{4}$ miles east of the Eastern Deer island; in the entrance to the creek, separating them, is a low and marshy islet, from which a bank extends somewhat to the southward and across to the entrance points of the creek. At Nianimaru the bank of the river is low and marshy, but about half-a-mile inland there are large trees with tangled undergrowth. A range of hills, about 200 feet high, extends in an east-south-east direction for several miles; the western extremity of this range bears N.N.W. from Deer island creek, and it passes about 2 miles north of Nianimaru.

Continuation of the river.—From Nianimaru the distance is 8 miles to the east extreme of Baboon islands, passing at 5 miles on the right bank the red hill of Kassang, which is conspicuous; the only channel available is south of Baboon islands. From the east end of Baboon islands to the west end of Ka Hai islands the distance is about 9 miles; the passage north of these latter islands is reported to have mud spits, which apparently uncover at low water and have snags on them, extending into it from the land at both entrances.

About 2 miles from the west end, and opposite the south-west extreme of Ka Hai islands, a ridge of rocks extends, from near a village on the south bank, half way across the river; this ridge is a danger, at high water, when it is not visible; from this to the anchorage off MacCarthy's island the distance is about 9 miles.

MacCarthy's island, about $5\frac{1}{2}$ miles in length and one in breadth at its broadest part, has channels north and south of it; the northern is generally used, but the channel to the southward of the island is supposed to be still navigable. Pangon island lies off the north-west end of MacCarthy's island, the main channel being between them.

Beyond MacCarthy's island low rocky hills, of volcanic origin, from 50 to 100 feet in height, enclose the Gambia valley.

Bush fowl, quail, sand grouse, plover, and pigeons are abundant, and alligators swarm on the banks of the river. The village, named George town, is situated about mid-way between the east and west extremes, but nearer the northern side of the island; it collects most of the produce from

the Niani and Ulli districts in the north, and from Diamaru and Tumané in the south.

Supplies.—Beef, vegetables, and bread may be obtained, and the river water is said to be suitable for drinking and other purposes.

Anchorage.—The anchorage, in $2\frac{1}{2}$ fathoms water off the principal wharf, is said to be good.

Trade.—There are two large branch factories of Bathurst firms, the trade being principally ground nuts and some rubber, brought down the river in cutters drawing about 7 feet; in 1890 six steamers loaded at MacCarthy's island, the heaviest draught being $13\frac{1}{2}$ feet.

Tidal Streams.—Between Albreda and Jurong creek the tidal streams continue to run 1 hour 20 minutes after high and low water by the shore. In the rainy season, July, August, September, and October, the flood stream is not felt higher than Kaua. Above this the stream is always running down, making the water fresh as far as Tankurál.

Off MacCarthy's island the flood and ebb streams were regular, the former lasting 4 hours, the latter 8 hours, the rise of tide being 6 feet.

Pilots.—Ships of over 12 feet draught, proceeding above Suara creek for the first time, should take a pilot.

Directions from Bathurst to MacCarthy's island.*—

From Bathurst the course is about South for 6 miles, until two small islets open to the northward of Dog island point, bearing about E. $\frac{1}{2}$ N., then steer S.E. $\frac{1}{2}$ S., giving Dog island point a berth of at least $1\frac{1}{2}$ miles to avoid the shoal extending south-west from it (*see* page 265), and when the land beyond Albreda opens of Lamin point, about E. $\frac{3}{4}$ S., alter course to E.S.E. to pass a mile from Lamin point and half a mile from fort James' islet. *See* Caution; pilotage, page 33.

When abreast of fort James' islet alter course to East and pass half a mile from Tudor point, and when the right extreme of Sami or Joba creek bears North, alter to E. by N. $\frac{1}{2}$ N., with Muta point ahead.† Do not shut fort James in with Tudor point, bearing West, until the east extreme of Vintang creek bears S.S.E.

When the entrance to Jurunka creek, bears North, steer N.E. by E. $\frac{3}{4}$ E., keeping a point to the eastward when nearly abreast of Unkafala creek, and continue on that course until Salikaine point opens of Muta point, bearing about E. by S. $\frac{1}{2}$ S. Pass Muta point at a distance of 3 to 4 cables, Tankural at three-quarters of a mile, and half a mile from Jarin point.

From abreast of Jarin point steer E. $\frac{3}{4}$ S. towards Tubabkolong point, and when abreast of Mendora creek bring the tree inside Jarin point to bear W. $\frac{1}{4}$ S. and steer about E. $\frac{1}{4}$ S. to pass 3 to 4 cables from Tubabkolong. After rounding Tubabkolong, keep about half a mile from the south bank

See chart No. 610.

* *See* chart No. 608.

† *See* chart No. 609.

until abreast of Kashan creek, then proceed in mid-channel. On passing Forester bank, which is reported to be extending to the northward, keep the trees at Tendebe just shut in with Kashan point, bearing W. $\frac{1}{2}$ S.

Pass 3 to 4 cables from Krule point, and then keep 4 cables from the south bank until Devil point bears E. $\frac{3}{4}$ N., when gradually alter course to the eastward, passing half a cable from Devil point. From this keep about a cable from the north bank as far as Farafinya creek; $1\frac{1}{2}$ cables off, until abreast of Kajamang creek, and afterwards in mid-channel. As soon as Ginoi point is shut in, bearing West, gradually close the south bank, passing Sankuia creek at the distance of one cable.

Steer in mid-channel from Karantaba creek and down Notown reach, inclining to the south bank near Buba creek and closing with it to pass half a cable from Bantang N'ding creek. Then proceed nearly in mid-stream south of Elephant island, keeping slightly on the island side.*

From the north end of Elephant island it is nearly 13 miles to Balangar, and for the first 5 miles the course is generally in mid-channel of the river, thence the channel inclines more towards the north or right bank, and from Balangar to the west point of Deer island a mid-channel course should be kept, as also south of the western Deer island, but after the creek dividing the two islands is passed, the channel lies rather more towards the northern bank, resuming a mid-channel course after passing Nianimaru, which is continued till nearing the eastern Baboon island, off which a spit extends narrowing the entrance to the channel.

Passing the Baboon islands the ship channel is generally nearer the south bank as a mud flat, about 3 cables in length, which uncovers at low water, spring tides, extends about one cable from the south shore of the western Baboon island, at about midway of its entire length, and here, by keeping close to the south bank, depths of from 15 to 16 feet will be obtained at low water.

There is only a depth of $8\frac{1}{2}$ feet at low water, spring tides, in the channel south of Ka Hai islands, and from a village on the south bank, south-west of the larger Ka Hai island, a ridge of rocks, not visible at high water, extends half-way across the river, the ship channel being on the island side.†

South of the largest, Ka Hai island, the river splits into three channels, formed by two other islands; the middle channel is the one used, and this is stated to be the narrowest and most difficult part of the river below MacCarthy's island, owing to low mud banks, which partly uncover, and extend from both banks into the channel, in which there are also snags. From the east end of the Ka Hai islands the course lies

* See chart No. 610.

† In 1899 H.M.S. "*Alecto*" found only 9 feet water north of the entrance to Patatale creek; here, at the village of Walli Kunda, there are two piers.

generally in mid-channel for $7\frac{1}{2}$ miles, south of Pangon island, to Fort George.

Vessels should anchor in as wide a part of the river as possible, and the kedye is recommended, as the anchor sinks into the mud.

Native sailing cutters drawing about 7 feet water keep up communication between Bathurst and MacCarthy's island, taking from 7 to 10 days going up; the masters of these vessels are said to be good pilots for the river.

Leaving Gambia river.—The best time to weigh from Bathurst under sail is on the last of the flood, so as to gain mid-channel before the full strength of the ebb, which, as it sets directly down upon the Middle ground, would, in light winds, make it necessary to anchor in order to avoid it. This would cause the loss of a day's tide, unless the sea breeze should come in sufficiently strong to enable the vessel to weigh again, and to stem the ebb; with that chance in view, if obliged to drop the anchor, it should be done sufficiently soon to preserve room for weighing. Further down the channel the sea breeze from north-westward is always a beating wind, and even the land breeze in the morning is seldom sufficiently to the eastward to lead out without making a tack, especially as when it is most favourable it has the least strength, and consequently the tide will have the more time to exercise its influence.

After weighing, stand over towards Barra point, keep the lead going and make very short tacks off the bank on the eastern side of the channel, especially when nearing African knoll, where the set of the ebb tide is always the strongest.

COAST.—From cape St. Mary to cape Bald is about 10 miles in a general W.S.W. direction; and at $2\frac{1}{2}$ miles further south-west there is another projecting point, with a reef extending west from it rather more than a mile, and with a rivulet of fresh water on its south side. Bijol islands, *see* page 256.

About this part of the coast there is a strip of dense tangled forest and underwood about half a cable in width, and beyond long grass and bamboo jungle, wooded with baobab palms, and with cultivation near the villages; the clusters of trees, from a distance, resemble islands. From this point the coast trends S. $\frac{3}{4}$ W. for a distance of 17 miles to the river St. Pedro, and from thence S.S.W. for 30 miles to the entrance of the river Kasamanze.

The general colour of the coast about cape St. Mary is variable, becoming white to the westward of the cape, and then reddish, and further southward changing into grey sand. Between cape Bald and the river Kasamanze the coast is very low, with a sandy beach covered with trees,

which in the vicinity of St. Pedro river appear from a distance like a continued forest, with lofty clumps resembling islands.

Southward of St. Pedro river, there are no trees, and the country becomes flat. The water is very shallow, the bank suddenly curves outwards, and abreast of Suta river, in lat. $12^{\circ} 44'$ N. and 17 miles from the shore, there is a 4-fathoms bank of 5 or 6 miles in length, lying in a N.E. and S.W. direction.

River Bliss, situated 12 miles north of the entrance to Kasamanze river; Suta river 3 miles south of Bliss river; and Oyster river $6\frac{1}{2}$ miles south of the same, all communicate with Kasamanze river, but their entrances are obstructed by sandbanks.

Depths off Shore.—Off the entrance of Kasamanze river there are depths of only 4 or 5 fathoms at the distance of 8 or 9 miles from the land, and at 10 miles distant there are 7 or 8 fathoms; at 11 miles from the north entrance point, in a W. by S. direction, there is a bank of $4\frac{1}{4}$ fathoms; the 10-fathoms line of soundings passes about 25 miles outside of the mouth of the river, and the 100-fathoms line is about 40 miles W. by N. from cape Skyring.

RIVER KASAMANZE.—The entrance to Kasamanze river is not easily recognised from the offing; it lies between Joqué island, on the north, and Guimbering island on the south; the Grand bank of Kasamanze, composed of hard sand with 5 or 6 feet water over it, lies between these islands. The land on the northern side of the entrance is low and wooded, without any distinguishing marks. Joqué island is covered with mangroves, and has on it the large village of Joqué.

From the north-west part of Guimbering island, shoals extend $2\frac{3}{4}$ miles off; the northernmost elevation on the island is rendered conspicuous from the offing by a white patch.

Karabane.—Karabane island situated north-east of the north extreme of Guimbering island, is separated from it by the Kachinane river, which has depths of from 23 to 26 feet, and from the mainland by the river Elinkim, navigable for vessels of 3-feet draught so far as the village of Ithie, a distance of between 8 and 9 miles; Karabane island is low, covered with brushwood, and has on its north side the town of Karabane, the principal French settlement at Kasamanze river. It is a place of some commercial importance, and frequented by steamers and trading vessels, which either take in cargo alongside stagings, or anchor off them in depths of from $1\frac{1}{2}$ to $5\frac{1}{2}$ fathoms.

LIGHT.—A *fixed red* light is exhibited from the quay at Karabane island; it is 52 feet above high water, and should be visible in clear weather from a distance of 3 miles.*

See chart No. 599.

* Temporarily discontinued.

Beacons.—There are three beacons at the entrance of the Kasamanze river. The first, a pyramidal shaped wooden beacon, about 20 feet in height on the east side of Joqué channel; the second, 60 feet high, about 4 cables south of the preceding; and the third, a wooden pyramidal shaped beacon, 20 feet high, on the northern part of point Guekim. The second beacon should be visible in clear weather from a distance of from 5 to 6 miles.

Least depth.—The channels across the bar of Kasamanze river vary greatly in depth and direction; in 1885, there was a depth of $3\frac{3}{4}$ fathoms at low water springs in the Great pass, and only 4 feet in the Little pass, the sea in this channel being nearly always smooth; in 1890 a yacht could not enter the river on account of there being only 10 feet water on the bar, and in 1894 it is reported that the north bank has extended about a mile to the south-west; the south bank is about half a mile further south, and a new bank, 2 miles in extent, has formed south-west of the north bank.

In 1897 the channel from seaward had a S.S.E. direction, with depths of from 11 to 16 feet at low water, spring tides, and vessels drawing 14 feet water could cross the bar at neap tides.

Buoy.—A fairway buoy, painted black, is moored in a depth of $3\frac{3}{4}$ fathoms at the entrance of the river; from it the beacon on Joqué island bears E. by S. $\frac{1}{4}$ S., distant $5\frac{1}{4}$ miles, and cape Skyring S. $\frac{1}{4}$ E.

Three small buoys, moored in a south-south-east direction from seaward, the outer painted red and two inner painted black, marked the channel in 1897. *See* Caution; buoyage, p. 33.

Pilots.—A pilot station with two pilots has been established on Joqué island; a government pilot for these rivers resides at Gorée. Pilots come out to ships at the anchorages with the ebb tide, and take vessels in during the last two hours of flood tide.

Anchorage.—Vessels while waiting for a pilot should anchor outside the bar in $6\frac{1}{2}$ fathoms water, with the hill on Guimbering island bearing S.S.E. $\frac{1}{4}$ E. Small craft, intending to use the North pass, anchor in 13 feet on the parallel of Joqué village.

Off Karabane, anchorage may be obtained at 3 cables from the shore, in 8 fathoms water, over mud.

North bank of the river.—At 3 miles east of Joqué point is the entrance to the Itu river, and here commences Vangaran bank which dries in places and stretches across the river joining St. George bank and having two channels through it; the southern being the broader and that more generally used.

About 8 miles east of Joqué point is the entrance to Gambi river, which is about half a mile broad: this river is navigable for vessels drawing less than $9\frac{3}{4}$ feet water, so far as Diebaly, and receives the waters of several smaller streams. About 20 miles further east on this bank is the entrance to the Jakubel river off which there are several islets; it is entered between the islets and the right shore and is navigable for vessels drawing $6\frac{1}{2}$ feet water, but its course is very sinuous. The country round this river is well cultivated, and on its banks are several French factories.

The river Songrogu or Yolas, which enters the Kasamanze, about 20 miles east of the Jakubel, has a very broad entrance, on which there is not more than 3 feet water; but in the river the depths are from 16 to 23 feet.

South bank.—From the entrance of Elinkim river, an extensive bank named St. George commences, and occupying about half the breadth of the Kasamanze river, continues to Sozor, or St. George point, 7 miles east-north-east of Karabane island. The depths on the bank are from 3 to 6 feet, and it is generally “steep-to” at the edge; near Sozor point a portion of the bank dries at low water, spring tides. At $2\frac{1}{2}$ miles south of Sozor point is the entrance to Kajinolle river, which is ascended by the French advice boats.

The French settlement of Zighikor is situated on the south bank about 20 miles above Sozor point. It is a collection of earth-houses, roofed with straw, and has about 1,500 inhabitants. A considerable depth of water may be carried up as far as this place, and a staging about 65 feet in length allows steamers of 18 feet draught to moor alongside; the river is navigated by large schooners much farther. There are several well-cultivated rice plantations near the shore, and some scattered huts.

Sedhiu, situated about 80 miles above the bar of Kasamanze river, is a flourishing French settlement; vessels, drawing 6 feet water, can ascend the river as far as this.

Boats, drawing about 3 feet water, ascend the river so far as the landing place of the village of Dianna, 32 miles above Sedhiu, but at 5 miles above this the bar of Yatacunda prevents the passage of canoes.

The water of the river is fresh at Sedhiu, and the minimum temperature of the year is 82° F.

Trade.—The trade consists of ground-nuts and india-rubber, leather or ox-hides, yellow wax, rice, cotton, ivory, and a small quantity of gold, brought from the interior, are also exported.

Tides.—It is high water, full and change, in the Kasamanze river at 9h. 55m.; springs rise $5\frac{3}{4}$ feet.

Tidal streams—In the Great pass the flood stream has a tendency to set towards the north, and the ebb towards the south bank; the rates vary from 2 to 3 knots an hour.

The tidal streams are felt so far as point Piedras, about 60 miles from the bar.

Cape Skyring.—At about 9 miles southward of the Kasamanze river there is an elbow of low reddish cliffs which interrupts the beach, named cape Skyring, as marking the place where the commander of that name lost his life on the 22nd of December 1833, while engaged in the survey of this coast; close to the southward of cape Skyring, in a bight in the shore, named Murder bay, his remains were rescued.

Bank.—A bank, of small extent, with a depth of 13 feet over it, lies about W. by N. $\frac{1}{2}$ N., distant 5 miles from cape Skyring.

CAPE ROXO.—From cape Skyring the coast trends S. by E. $\frac{1}{2}$ E. for a distance of 6 miles to cape Roxo, that forms the north-west limit of the approach to Cacheo river. The cape, when bearing about E.S.E. presents the appearance of downs of white sand moderately high, and covered with bushes. At 2 or 3 miles northward of this cape the country is well wooded, and of a tolerable height, which it preserves for an extent of 9 miles. On one of the points, formed by the coast, there are several red patches, from which the cape has probably derived its name, but the cape itself is a low sandy point, covered with trees and bushes.*

Bank.—A bank, about a mile in extent, and with 3 fathoms water over it, lies about $1\frac{1}{2}$ miles south-west of cape Roxo.

Cape Barella, with its somewhat higher range of trees, lies S.E. $\frac{1}{4}$ E., distant 8 miles from cape Roxo, and half-way between them there is an indistinct opening in the beach, named Subyack creek, which is said to communicate with the Kasamanze river. Cape Barella presents the appearance of white sand-hills and reddish cliffs of clay, and from both this cape and cape Roxo, reefs a mile in length project to the southward, the 3-fathoms line being 4 miles west of cape Barella.

CACHEO RIVER.—Jufung point, low and wooded, is situated 8 miles south-east of cape Barella, the intermediate coast being very low, with the appearance of being intersected by small rivers or creeks, and fronted by a broad shallow flat. At Jufung point the low wooded coast turns to the eastward for 5 miles to Bolola point, from which cape Mata bears S.E. $\frac{1}{2}$ E., distant 5 miles, these two latter projections forming the entrance points of Cacheo river.

* See Admiralty charts :—Cacheo river to Isles do Los, No. 600; scale, $m = 0.13$ inch; Cacheo river, No. 1,722; scale, $m = 0.5$ inches.

Bolola point is low, with some lofty trees situated 2 miles west of it. At this point the shore abruptly turns to the northward, forming **Katon bay**, on the west side of which stands Bolola, a large village on the beach, and an intricate channel, with 5 fathoms water in it, may be found leading close up to the houses. The ground in the neighbourhood of the village is low and swampy, with extensive plantations of rice.

Between Jufung and Bololu points there are two isolated and remarkable clumps of large trees. The clump to the eastward of Jufung point is named the wood of Jufung, and that to the westward of point Bolola the wood of Bolola.

Katon bay is 2 miles in breadth at the entrance, and from the head a deep creek opens to the north-east, which is said to communicate with the river Kasamanze, at Zikinkor.

Cacheo banks.—The triangular space enclosed by the shore, and by lines drawn to the southward from cape Skyring, and to the westward from Jufung point, is full of shallow banks and irregular shoals, on many of which the sea breaks furiously:—Coimbra bank, the western limit of which to the 3-fathoms line bears S.S.W., distant 5 miles from cape Roxo*; Falulo breakers, S. by W. $\frac{1}{4}$ W., $10\frac{1}{2}$ miles from cape Roxo; Barella breaker, $3\frac{1}{2}$ miles eastward of the latter; and Jufung breakers, which extend 6 miles westward from Jufung point, may be termed the northern group; while to the southward of the Direct channel into the river are situated Cacheo spit, Cacheo bank, Cacheo breakers, Parcels breakers, Cachops breakers, Garamas spit, and Mata and Domingo banks.

Depth in channels.—Two main channels lead from seaward to Cacheo river, the northern, known as the Direct channel, has a depth of 12 feet, and the southern, termed the South-west channel, 15 feet at low water.

Nature of bottom.—There is a satisfactory rule which applies to the entrance of the Cacheo, as well as of all the rivers on this part of the coast of Africa, and which the seaman should bear in mind; that *in the channels the bottom is always of soft mud*, but *on the banks always of hard sand*; and, therefore, the lead in a careful hand will give immediate notice of any deviation from the fairway.

Directions.—Direct channel.—The point at which a vessel must enter this channel is 13 miles from the nearest land about cape

See chart No. 1,722.

* The French man-of-war *Dakar*, drawing 10 feet, Lieutenant-Commander Pierre, reports, that when going from cape Roxo to the channel of the entrance of Cacheo river on a straight course, the vessel grounded at low water at the distance of 5 miles S. $\frac{5}{8}$ E., from cape Roxo, and that there was a line of breakers at one mile to the southward.

Very probably the *Dakar* grounded on Coimbra bank, which has extended to the eastward.

Barella, and 16 miles from Jufung point; and to make anything like a straight course through it, being out of sight of all marks, several shoals, with depths of 2 and $2\frac{1}{2}$ fathoms at low water, must be crossed.

As the highest tides do not rise more than 7 or 8 feet, a vessel of a certain draft only can with any safety attempt it; and the best manner of proceeding will be to run in for the land somewhat to the northward of latitude $12^{\circ} 20' N.$ so as to distinguish the red cliffs between capes Skyring and Roxo, but not approaching it in less water than 5 fathoms, nor to a less distance than 2 or 3 miles. Then steer S. by E. $\frac{1}{2}$ E. till abreast of cape Roxo, so as to see that point with certainty, for as its termination is low and sandy, and, like the other parts of the coast, covered with bushes, it does not appear well defined at a distance.

Having now that cape on the port beam or bearing about E. by N., a look-out at the mast-head for broken or discoloured water, leadsmen in both chains, and being ready to haul out if they should call less than 4 fathoms, steer S. by W. for 11 miles, making due allowance for the deviation of the compass, which for such navigation, ought to have been previously ascertained.

During this course the soundings will probably indicate when passing over the tail of Coimbra bank, the heavy Falulo breakers, not always visible, may be seen, and at the end of the 11 miles the vessel ought to be in the fairway of the channel, in latitude $12^{\circ} 8' N.$, and in 6 or 7 fathoms water.

At this point, however, it would be prudent to anchor, in order to verify the latitude by observation, to wait for the sea breeze, or to take the commencement of the flood tide, and, if practicable, to get out a couple of boats ready to send ahead with danger flags, in case of becoming entangled among the shifting sands which are found in the entrance of all rivers of this kind.

To enter.—These precautionary arrangements having been made, the weather being tolerably clear, and an anchor ready to let go, with a range of 10 or 12 fathoms of cable, the vessel may steer E. $\frac{1}{2}$ S. If the channel has been properly entered, for a distance of 7 or 8 miles depths of from 6 to 7 fathoms will be preserved and the Jufung breakers should be seen on the port bow, and passed in a depth of $4\frac{1}{2}$ fathoms, at the distance of half a mile, and their south-east sandy prong will have to be crossed in 2 fathoms water.

After passing this, the water should suddenly deepen, and the land having been for some time in sight, the high trees of Bolola should be made out and brought ahead, on the bearing of E. $\frac{1}{2}$ S., and kept so till within about 2 miles of the beach. Then alter course nearly a point to

starboard, but still closing the shore, so as to keep in the deep but narrow channel northward of Domingo bank, and run parallel to the beach (off which some rude fishing weirs may be observed), till the low point of Bolola bears N.E., distant about a mile.

If the vessel's draught is not more than 12 feet, steer S.E. by E. $\frac{1}{2}$ E. from thence for cape Mata, till the main channel of the river is reached ; but if requiring deeper water it will be prudent to anchor and send boats to examine the best track across the bank or bar, which unites Domingo bank to Katon flat.

Anchorage.—Having crossed this bar, and now fairly entered the river, anchor in 6 or 7 fathoms water over good holding ground between Bolola point and cape Mata, or pursue the voyage to Cacheo or farther up, according to the objects in view.

South-west channel.—The above are the best rules which can be given for entering Cacheo river by the Direct channel, an enterprise requiring great coolness and promptitude, and which should be attempted only under favourable circumstances, and in a manageable vessel. But as there is reason to believe that the banks which form that channel are not stationary, and that they frequently change both in shape and extent, it will be proper to give the mariner the choice of another entrance, which, though more circuitous, and equally surrounded by dangers, has somewhat deeper water, and offers better opportunities for a retreat in case of unforeseen difficulties.

Directions.—To take the south-west channel, make the land between capes Skyring and Roxo as before directed ; approach it within 5 or 6 miles or into about 6 fathoms water ; run along shore till cape Roxo bears E. by S. $\frac{3}{4}$ S. so as to be sure of the position, and then haul off to make a S. by W. $\frac{3}{4}$ W. course, allowing for tide, current, and swell, and pursue this course for 19 or 20 miles.

If the deviation of the compass has been previously checked, and the above allowances fairly made, at the end of this run the vessel will be in latitude $12^{\circ} 0' N.$, and in 7 or 8 fathoms water, and will have passed well outside all the banks, although the lead will probably show the change of a fathom or two in the soundings when crossing their tails. Here it will be prudent to anchor, in order to verify the latitude, and to wait for the sea breeze, a flowing tide, and sufficiently clear weather, as well as to make all those arrangements which were recommended for the former channel, and which are so necessary in such intricate navigation.

Supposing that everything has turned out favourably, weigh and steer E. by S. $\frac{3}{4}$ S. for a distance of 15 or 16 miles, allowing for the oblique set

of the flood tide. During this run the Parcels breakers will probably have been discerned from the masthead, and the Cachops breakers will be more certainly seen, in passing them at a distance of 2 or 3 miles on the port beam. The water will have been gradually shoaling, so that by this time the depth will be reduced to nearly 5 fathoms, and unless the weather should have become hazy, the low land will be seen ahead, and Cayo islands bearing S.E. $\frac{3}{4}$ S.

The three points on which the mariner has to rely for a knowledge of his position, are, the sight of Cachops breakers, the distant bearing of Cayo islands, that are situated at the dividing point of Cacheo and Jebra rivers, and the fact of having arrived at the (low water) depth of 5 fathoms. From this position steer up the south-west channel, N.E. $\frac{3}{4}$ E., or N.E. $\frac{1}{2}$ E., or farther to the northward, according to the state of the flood.

The Admiralty chart will show, if these banks do not materially alter their positions, that in making a straight course up this channel, the vessel will have to cross both the eastern prong of Cachops breakers and the long spit which projects from Garamas island, and will, therefore, at each of those places lessen the depth of water for a east or two of the lead to $2\frac{1}{2}$ fathoms; but if the vessel be under good command, a judicious yaw will keep her in a proper depth.

About 8 miles of this N.E. $\frac{3}{4}$ E. course will lead to the edge of the bar, that has generally $2\frac{1}{2}$ fathoms at low water, spring-tides, and as the tide will have been for some time rising, it will be probably crossed in more than 3 fathoms, unless the swell should be very heavy. But before reaching the bar, the high trees to the westward of Bolola point will be seen from aloft, and should be brought ahead on the bearing of N.E. $\frac{3}{4}$ E. Garamas island will also be seen, and ultimately cape Mata will rise upon the starboard bow.

Anchorage.—The bar being crossed, the lead will suddenly drop into 6 or 7 fathoms, and the vessel will be in the main channel of Cacheo river, with the low point of Bolola bearing E.N.E., distant 5 miles, and cape Mata E. by S. distant 8 miles, the course must then be immediately altered to E. $\frac{1}{2}$ S., till abreast of cape Mata or in such a berth as it may be thought proper to take.

From abreast of cape Mata, the course up Cacheo river is about E.N.E. for a distance of 11 miles, so far as the old Portuguese fort of Cacheo. To this position the lead will be found a safe guide, and any vessel may safely anchor off the fort in 5 fathoms water, over good holding ground. The shores are everywhere covered with mangroves, which, growing in the water, render landing impracticable, except at a few spots. In 1869 Cacheo was declared a free port.

River above Cacheo.—The Admiralty chart shows, that as soon as the two entrance capes are passed, vessels of any draught, that can enter the river, may freely proceed to the fort of Cacheo; vessels drawing 12 feet can go up to within 4 miles of Farim, which is situated nearly 100 miles from cape Mata. In that whole space there is but one danger, viz., a bank which fronts the northern shores east of Sara creek, 13 miles above Cacheo fort, which projects a little more than half-way across the river; it may be easily avoided by borrowing on the southern shore.

Farim, on the right bank of the river, 85 miles from Cacheo fort, is a small place, with few native inhabitants. The appearance of H.M.S. *Raven* (1834) produced no little alarm among them; a few refreshments were easily obtained, and as the rapids are only a short distance higher up, the water alongside was pure and good. The freshness of the climate was invigorating, after the sickly heaviness of the atmosphere, from which her crew had greatly suffered when lower down the river, but the unfriendly habits of the natives forbade much intercourse; at Salsang, 42 miles above Cacheo, the same hostile spirit displayed itself.

Near Farim the mangrove entirely disappears, the country becomes clear, a gently-rising tract of fertile soil commences, and a few scattered cotton plantations may be seen in the vicinity of that village. It is said that there is easy and constant communication from hence to Bissao, and to Kasamanze and Gambia rivers.

Batur is the largest town on the river, situated 70 miles from Cacheo fort, and the inhabitants are the most civilized; they are all Mahomedans and of the Mandingo tribe, which is the most powerful of the numerous tribes that have possession of this country.

At the town of Batur the clay soil is visible between the mangroves, the shores become steeper and rocky, and good-sized forest trees, including the mahogany, are seen on the banks.

Tides.—It is high water, full and change, on the bar of Cacheo river at 7 h. 45 m.; springs rise 8 feet.

Tidal streams.—The ebb stream in the Cacheo, as also off it, sets to the N.E., and the flood to the S.W. The ebb generally runs 8 hours, while the flood rarely runs more than 4, nor can it generally be considered a regular flood tide, but merely a slack water or cessation of the ebb. Towards December, after the rains are over, and the harmattan season has set in, the wind generally blows very strong from N.E. to E.S.E. which tends considerably to strengthen the ebb stream, and during that season vessels at anchor rarely swing to the flood.

The flood tide is scarcely felt above Batur, 70 miles from Cacheo fort, and the ebb stream is not very strong in any part of the river, except towards the end of the rainy season (about December).

Garamas island, 4 miles south of cape Mata, is covered with trees but lies so close to the shore that it is not easily distinguished.

Jatt shoals.—About 20 miles of a low forbidding shore, with very shoal water off it, separates the river Jeba from the Cacheo, or, in other words, extends to the southward from cape Mata to Cayo point. In that space, about midway, the Jatt shoals, which project 10 miles north-west from the mouth of Jatt channel, terminate in a shoal, which always breaks; a flat on which there is less than 3 fathoms water, extends 5 miles westward from Cayo point.

Cayo islands.—The Cayo islands are situated in lat. $11^{\circ} 50' N.$ 38 miles S. by E. $\frac{1}{2}$ E. from cape Roxo; they lie close to Cayo point, appearing at a distance like three small hummocks, but at low water their bases unite; they are not high, but being covered by dark lofty trees stand out very conspicuously at times from the low land behind them, and form the principal landmark for approaching the Jeba river.

JEBA RIVER.—The Jeba is a much larger river than the Cacheo, its mouth being 15 miles wide, in a S. by W. direction, from Cayo point to Karashe island, the north-western of the Bijouga group; at 90 miles eastward of Cayo point it has a breadth of 4 miles. There are many dangerous banks in its entrance, as well as higher up, but they may be easily avoided, and it is not traversed by any shallow bar. The usual channels by which Jeba river is entered are Jeba channel, leading to Bissao channel on the northern side of the estuary, and Orango channel, leading to Kanabak reach and Bulama and Arcas channels on the southern side.*

Above Bissao the channel of the river is obstructed by numerous shoals, the passage among which is only available for small vessels.

The periodic rise of Jeba river commences in July, the waters begin to fall about the middle of September and continue falling until the end of October.

BIJOUGA or BISSAGOS ISLANDS.—This extensive group of islands is situated in the estuary of Jeba river, dividing the northern and southern approaches. It was partly surveyed in 1826–34, but not sufficiently examined to enable strangers to make free with the various channels by which it is intersected; nor is it likely that there will be any inducement for vessels to penetrate its interior waters, or to have any

See chart No. 1,722.

* See Admiralty charts:—Bijouga islands and river Jeba, sheets 1 and 2, Nos. 1,726, 1,724; scale, $m = 0.5$ inch.

farther intercourse than may be afforded by the open channels of Jeba and Orango. Besides a few bare or unproductive rocks, the whole cluster consists of 13 islands, occupying a space of about 50 by 35 miles. They are all volcanic and highly fertile, although, as far as could be perceived, generally deficient in water.

Most of the islands are inhabited; the men are active and powerful, but proverbially revengeful and treacherous, and although now not actually hostile, keep very much to themselves, occasionally bringing poultry and fruit up to Bulama in exchange for firearms and powder. Their houses are circular, and built of stones and mud; the doors are low, and there being no windows, they are dark and insufferably hot, though well thatched, with broad projecting eaves. They make long trading expeditions, and their canoes are large and clumsy; some would contain 40 or 50 armed men with paddles.

Shoals and foul ground extend for a considerable distance west and south of Bijouga islands, which should be approached with great caution.

Bijouga breaker.—A small bank, on which the depths of water are from 12 to 18 feet, is situated W. $\frac{7}{8}$ S., distant 39 miles from Cayo point from the shoal cape Roxo bears N.N.E. $\frac{3}{4}$ E., distant 50 miles, and Karashe island, the nearest land, E. by S. $\frac{3}{4}$ S., distant 28 miles.*

A shoal, on which the depth of water is 12 feet, lies S.E. $\frac{1}{2}$ S., distant 5 miles from the west end of Bijouga breaker.

Warang bank, which partially dries at low water, lies off the western entrance to Warang channel and extends 7 miles in an east and west direction within the depth of 3 fathoms, its western extremity bears W. by S. $\frac{1}{2}$ S., distant 25 miles from Cayo point.

Remarks.—During the harmattan season, when steering for the Bijouga islands, or navigating the channels between them, the reckoning and lead will be found the best guides, the land being difficult to distinguish from a distance of more than 3 miles. The currents are uncertain and and there is usually much haze and inclination to smokes.

Most of the banks in Jeba river, and among the Bijouga islands, are composed of hard sand and are “steep-to,” so that the unceasing use of the lead is even less efficient in giving warning by the actual depth of the water, than by showing the nature of the bottom, which in the channels is generally of soft mud, and round the edges of the banks of hard sand; therefore instant attention should be paid to the change thus indicated.

JEBA CHANNEL.—The entrance to Jeba channel is obstructed by Cayo, Middle, and Karashe banks; of the four channels formed by them, Cayo channel is the only one recommended for large vessels.†

* See chart No. 600.

† See chart, No. 1,724.

Cayo bank, about 8 miles long within the 5 fathoms line, in an east-south-east and west-north-west direction, is narrow and has over it a general depth of 4 fathoms, but in one place, bearing S. $\frac{1}{4}$ W., distant 4 miles from Cayo islands, it rises into a knoll of sand with only 12 feet water upon it.

Middle bank, also narrow, is parallel to, and about three-quarters of a mile south of, Cayo bank; it is about 5 miles long within the depth of 5 fathoms, the least water on it being 3 feet.

Karashe bank lies about 2 miles south of Middle bank; the eastern part is marked by heavy breakers, and a detached shoal, with 12 feet water over it, lies about a mile north of its western extreme.

Arlett point, the south-west extreme of Bassis island, though very low, is prominent, being thickly wooded to its extremity; until nearly abreast of it the village near the shore is hidden by trees; it lies S.E. $\frac{1}{2}$ E., distant 14 miles from Cayo islands. Bassis island is well cultivated and there are numerous villages inhabited by Mandingos.

The whole of this part of the coast is bordered by fishing stakes, to which are attached traps for fish. In the space between Jatt and Bassis islands, the wide opening of Catherina bay will be seen; the head of this bay unites with the channel round Jatt island, and, with Balantes bay and Martinho and Bissao creeks, divide the right bank of Jeba river into a series of large islands.

Supplies.—At the villages on Bassis island, poultry, eggs, pigs, beef, and mutton may be obtained in quantities, also oranges, lemons, and bananas, several varieties of wood may also be procured.

Anchorage may be taken up in depths of from 8 to 11 fathoms about $2\frac{1}{2}$ miles south-south-east of Arlett point, but this anchorage is not a good one with westerly winds and an ebb tide.

Arlett bank, on the western part of which there is only a depth of 15 feet, extends in a N.W. by W. and S.E. by E. direction for a distance of 3 miles within the depth of 3 fathoms; the eastern edge of this bank lies W. $\frac{1}{4}$ N., distant $2\frac{1}{4}$ miles from Arlett point.

Balantes bay.—Biombo point, which is low, but safe to approach on its southern side, forms the eastern entrance point of Balantes bay, a deep inlet between Arlett and Biombo points.

The entrance to this bay is obstructed by shoals. Strangers entering it should engage a pilot.

Ankora islands, three in number, are situated off Ankora point, $2\frac{1}{2}$ miles east of Arlett point; the two northern islands are attached to Ankora point by soft mud banks, which dry at low water; the western of these is very low; the southern island, $1\frac{1}{4}$ miles south of Ankora point, with a deep channel between it and the northern islands, is marked by a conspicuous tree on the summit.

Anchorage may be obtained in 10 fathoms water, over mud and sand, good holding ground, north of the bank which extends eastward from the south Ankora island. The east side of Kellett island in line with the N.E. Ankora island, bearing N.E. by E. $\frac{1}{4}$ E., leads north of the southern island, and when Arlett point is seen midway between the islands, bearing about N.W. by W. $\frac{3}{4}$ W., the course is more to the eastward, passing about $2\frac{1}{2}$ cables south of the northern islands and anchoring as soon as 10 fathoms is obtained ; the tidal streams are strong at this anchorage.

Landing may be effected, at high water, on a white sandy shore to the northward of Ankora point, but after half tide the shore is all mud, making landing almost impossible ; except by a natural causeway of rocks which connect the western Ankora island with the shore.

Martinho bank, a narrow but steep ridge with only 6 feet over it at low water, is exceedingly dangerous, as it seldom breaks ; it is 2 miles in length, east and west, the western extreme of 3 fathoms lies S.E. $\frac{1}{2}$ E., distant $3\frac{1}{2}$ miles from Biombo point. There is a passage between this bank and the flats off Martinho creek, but unless in a case of the greatest necessity all vessels should keep out in the main channel south of Martinho bank.

When in 10 fathoms water, at about a mile southward of the bank, Biombo and Martinho points bear N.W. and E. by N. $\frac{1}{2}$ N. respectively, and therefore in proceeding up or down the river, a vessel should not borrow on the bank by parting with the one bearing till the other be obtained.

On the south side of the channel, abreast of Ballantes bay, shoals extend for a considerable distance from the land ; of these Formosa bank, with from $6\frac{1}{2}$ to $9\frac{3}{4}$ feet water, small and very dangerous, lies about $3\frac{1}{2}$ miles north of Formosa island, and about $7\frac{1}{2}$ miles east of this, Arriskado banks, consisting of several pinnacles of sand and gravel are very "steep-to," on the northern side ; the channel between these banks and the south side of Martinho bank being barely 3 miles wide. The Papagaio islands lying between, but to the southward of, these shoals are four or five in number and wooded.

St. Martin grove is a conspicuous clump of trees situated one mile inland, at 6 miles eastward of Martinho point ; a conspicuous isolated tree named Casheater, is situated $1\frac{3}{4}$ miles west of St. Martin grove.*

Directions.—Entering by the northern channel or Cayo channel, a vessel should get into the latitude of Cayo islands, or a mile or two farther to the southward ($11^{\circ} 48' N.$), and steer E. by S. $\frac{3}{4}$ S., across Great Jeba flat in depths decreasing from 8 to 7, and 6 fathoms, till Cayo islands are seen ahead, or a little on the port bow.

Coming from the northward, and having made cape Roxo satisfactorily, an equally sure method of hitting the entrance will be to bring that

See chart No. 1,726.

* See chart, No. 1,724.

cape to bear E. by S. $\frac{3}{4}$ S., distant about 6 miles; then, allowing for the tide, steer S. by W. $\frac{3}{4}$ W. for a distance of 20 miles, which will place the vessel in lat. $12^{\circ} 0' N.$ and in 8 fathoms water; from this position steer S.E. $\frac{1}{4}$ E., and the soundings will indicate a gradual approach towards the edge of Jatt flats; this course will lead safely to a position within sight of Cayo islands.

Cayo islands should be passed in depths of 6 or 7 fathoms, at a distance of not more than 2 miles, in order to pass north of Cayo bank; from this position steer S.E. $\frac{1}{4}$ E., which will lead south of Arlett bank, from whence an E.S.E. course will lead across the broad mouth of Balantes bay, in a depth of 10 to 20 fathoms, though over very uneven ground, passing $1\frac{1}{2}$ miles south of Ankora islands.

Anchorage.—Having entered the river in the evening, a safe berth to wait for daylight is in 14 fathoms water off Balantes bay, with Biombo point bearing E. by N., and the southern Ankora island N.W. $\frac{3}{4}$ N.

BISSAO.—The town of Bissao, with about 400 inhabitants, is surrounded by a walled fort; the Portuguese have a garrison there consisting chiefly of convicts and mulattoes, except the officers, who are detached from the cape Verde islands, of which this settlement is a dependency. In 1869 Bissao was declared a free port. There appears to be no territory attached to the port.*

The whole island of Bissao has the appearance of being extremely fertile, and the population is proportionately great. It is divided among several independent chiefs, the most powerful of whom resides in the large native town adjoining Bissao, which contains 6,000 or 7,000 inhabitants.†

Communication.—There is telegraphic communication, by a cable, between Bissao and Bulama, Bathurst, Sierra Leone, and Konakri. (See page 8.)

Supplies.—The market is scantily supplied with the commonest necessities of life.

Fresh water.—A watering-place is situated on the beach a little westward of the fort; it consists of pits 3 or 4 feet deep, but not more than 30 barrels can be filled in a day, and it then requires to be filtered for drinking. It is said to be wholesome, and to keep well, which appears rather doubtful. There is another watering-place on Passaro island.

Firewood.—Bissao is a bad place for laying in a stock of fuel, for though most part of the country is covered with forest, yet the natives are

See chart, Nos. 600, 1,726.

* See chart 1,724.

† See view on chart No. 600.

lazy and bring it with reluctance, delivering it at very high prices, and neither the climate nor the hostile disposition of the inhabitants will allow the crews of vessels to cut wood for themselves.

Trade is comparatively at a standstill. Rubbers, beeswax, gum, and ground-nuts are the chief exports; and the imports, cotton goods, tobacco, guns, and gunpowder.

Prohibited anchorage.—There is a telegraph cable from Bissao to Bulama, and anchorage is prohibited between the south-west point of Rey island and Bissao fort; vessels must not pass to the north-eastward of this line. Between Passaro island and Pedralva rocks, and on a line south-west of Colonia point is also a prohibited anchorage. The direction of the cable was marked by buoys; but as they have been reported to be adrift no reliance can be placed on them. *See Caution; buoyage, page 33.*

Directions.—From a position in 10 fathoms water, at one mile south of Martinho bank, on E. $\frac{1}{8}$ N. course may be shaped, so as to keep near the northern shore, to avoid too near an approach to the suspicious flats which project from Gancho banks; a run of 13 miles through irregular soundings of 10, 5, and 12 fathoms, will take the vessel abreast of Bernafel point, which, on account of a shallow spit and discoloured water, should be passed in depths of from 7 to 9 fathoms, or at a distance of 2 miles.

By this time the town and fort of Bissao, and the two conspicuous islands Passaro and Rey will have been seen; by opening the latter half-way out to the eastward of the former, bearing about N.E. by E., the spit will be avoided, and a clear course offered to the anchorage. Run along the eastern side of Passaro island, which seems to be quite safe at the distance of half a mile, and steering for Bissao fort, anchor either half-way between the islands or proceed at once to the town, off which a good berth may be taken in 7 fathoms water, over mud, with the fort bearing N.N.W., and Rey island between S.E. by S. and East.

Short spits extend from the north-east and south-east extremes of Passaro island, and from the south-west extreme of Rey island, and from the latter island an extensive bank extends to the north-east.

Tides.—It is high water, full and change, at Bissao, at 11h.; springs rise 8 feet, but higher up the river are said to rise 14 feet.

Tidal streams.—At the anchorage the eastern stream ends at 12h. 30m., and at spring tides the tidal stream runs about $2\frac{1}{2}$ or 3 knots an hour.

To leave Jeba river.—The vessel which has been brought up in the preceding pages to Bissao, by Jeba channel, will now be conducted to sea again by the southern or Orango channel; the links which connect

those two great inlets being Arcas and Bulama channels, and Kanabak reach.

ARCAS CHANNEL.—The channel branches off from Jeba channel about 10 miles below Bissao, and is formed by Gancho banks to the westward and Arcas flat to the eastward. Its narrowest part is about one mile wide, between a depth of $3\frac{1}{2}$ fathoms on either side. There are depths of 14 and 16 fathoms in some parts of it, while in others only 5 fathoms will be found at low water; this unevenness in the bottom produces overfalls with the tides, which sometimes appear alarming.

Along the edge of Arcas flat, parts of which dry at low water, the soundings are very irregular, but it may be cautiously approached with two quick leadsmen in the chains. The bank south-west of Arcas flat is reported to be extending in that direction.

The soundings on the western side of the channel are rather more regular, and the slope of the bank inside of the 5-fathoms line more gradual. This channel was surveyed in 1846, so it is advisable to have a pilot; vessels coming from the northward can obtain one at Gorée.

The chief difficulty in navigating Arcas channel may be said to arise from its being so completely sheltered that the sea seldom breaks upon its rocks or banks.

Buoys.—The Arcas channel is sometimes buoyed, but in 1897 it was reported that there were none in the channel; no dependence should be placed on finding them. *See* Caution; buoyage, page 33.

Pedralva rocks.—These rocks are situated on the western side of Arcas channel, about a mile south of Gancho banks; the principal rock lies $7\frac{1}{2}$ miles N. by W. $\frac{3}{4}$ W., from Bulama point; it shows a little after half ebb, and should be seen if possible by all strangers attempting to proceed through this narrow passage.

Beacon.—A beacon, consisting of a tripod surmounted by a black ball, marks the south-east of these rocks; it is not to be depended upon.

Anchorage.—The anchorage is good in most parts of the channel, though there are some deep holes and shallow spots, which last are probably indicative of foul ground in the vicinity; these shoals generally produce strong ripples. When any of the fierce tornadoes which are so common on this coast are seen approaching, vessels ought to anchor immediately; and if they are bound to Bissao, it may be useful to know that, if detained by wind or tide, their boats can communicate with that town by the pass to the eastward of Arcas island.

Directions.—In leaving Bissao road, in order to proceed to Orango channel or port Beaver, after rounding Passaro island, steer S.W., allowing

See chart No. 1,724.

for wind and tide, so as to bring that island astern, and apparently midway between Middleton point and Rey island, bearing N.E., which will lead half a mile north-west of Arcas flats, and in a direct line towards Pedralva rocks.

When the principal tree of the grove of St. Martin bears N. $\frac{1}{4}$ E. the vessel will be within $2\frac{1}{2}$ miles of the beacon, and may then steer about S. $\frac{1}{4}$ E. for Bulama point. Having reached within a couple of miles of that point, edge a little to the westward, and pass it at the distance of a mile, in order to avoid the shoal ground extending from it; and here, as well as in all parts of this channel, remember that the flood sets to the N.E. and the ebb to the S.W., and therefore obliquely athwart the banks.

The buoys, if in position, are of great assistance in navigating the channel.

Tides.—It is high water, full and change, at 10h. 10m. throughout the Arcas channel; spring tides rising from 11 to 14 feet, and neaps about 9 feet.

BULAMA ISLAND has a population numbering 4,000, who are an industrious set. The island is very fertile, and is for the most part cultivated and grows maize, ground-nuts, beans, mandioca, &c. Cotton trees are common and the mango thrives. Excellent fish are caught in fish ponds.

Bulama point, the western extreme of Bulama island, has two conspicuous trees on it, and extending from it there are few reefs which are “steep-to”; the point, however, may be safely approached to within a mile. The English had a settlement on this point, but evacuated it in 1868, since which time the buildings have gone to ruin.

Hacket reefs.—Areia Branca shoal.—At 4 miles south-east of Bulama point, is Hacket point, off which Hacket reefs extend about $2\frac{1}{2}$ miles to the southward; and 3 miles south of Hacket point is Areia Branca shoal, on which the depth is 3 fathoms.

Buoy.—A spherical buoy, painted black, marks Areia Branca shoal: but its position is doubtful (1897). *See* Caution; buoyage, page 33.

Anchorage.—Between Bulama and Hacket points, in a bight named Dalrymple bay, fair anchorage may be obtained in from 8 to 13 fathoms water, over sand and mud, with Bulama point bearing about N.N.W. The anchor must be ready to let go on shoaling to less than 20 fathoms, for inside of 8 fathoms the bank is steep. If this anchorage can be taken without risk, it may be a convenient berth in which to wait for the tide, as the holding ground is good and there is but little tidal stream; water may be procured on the adjacent beach.

BULAMA CHANNEL.—From midway between Bulama point and the north-east extremity of Gallinha island, the course through Bulama channel is S.S.E. $\frac{3}{4}$ E. for a distance of 7 or 8 miles, or until within 4 or 5 miles of the low shores of Manteri island. This course equally avoids Hacket reefs on the eastern side, and on the other the eastern prong of the large shoal which seems to connect the islands of Gallinha and Kanabak; all these shoals are too steep to admit of much benefit from using the hand lead, for a large vessel ought not to pass within the depth of 16 or 17 fathoms.

Bolola channel.—The Bolola and Bulama channels join south of Hacket reefs; the former is the estuary of Bolola river and port Beaver. Bolola channel is narrowed by Beggars bank extending about $2\frac{1}{2}$ miles from the south shore of Bulama island; several places on the bank uncover at low water.

CAUTION.—Buoys.—Areia Branca shoal, Mao bank, and the shoal extending west from Colonia point are, from time to time, marked with buoys, but, owing to the strength of the tides and other causes, the buoys are frequently adrift and often not replaced for some considerable time; therefore the existence of buoys may always be considered as doubtful, and if met with in the various channels their position as marks for shoals should not be assumed as correct.

For prohibited anchorages, *see* page 285.

Bulama town, the capital of Portuguese Guinea and the seat of government for the province, stands on the site of port Beaver, so named from the settlement that was formed by Captain Beaver, in 1792, on the eastern side of the island of Bulama, but which was abandoned in the following year. The town is superior to Bissao and boasts of some excellent barracks, with a comparatively strong garrison mostly composed of soldiers under sentence, both towns being convict settlements.

The harbour is easy to approach, the anchoring ground excellent, and the shelter perfect, but shipping work is carried on under great disadvantages.

Communication.—The steamers of the German line of Woermann Company call at Bulama, but the dates are uncertain; there is also a monthly mail to the cape Verde islands by a small Portuguese steamer, which, although intended to connect with mail steamers there, is unreliable. British trade is carried on by one or two small steamers from Sierra Leone. A telegraph cable connects Bulama with Bissao.

Supplies.—Fresh provisions, such as oxen, sheep, poultry, eggs, and fruit are easily obtained and very cheap.

See chart No. 1,724.

Water may be procured with some little trouble on the island, and more easily on the opposite shores of Biafares island, near the south-west extreme of which there are three springs. Water may also be procured from a well, with a pump, near the mole, but it can only be obtained at or near high water.

Repairs.—There is a smithy and slip for small vessels, which may get some repairs.

Mole.—The wharf, which is prolonged by a mole constructed of masonry, has not been extended for a sufficient distance and it dries at the extreme at low water, spring tides; it however makes landing easy.

Mooring buoys.—There are two mooring buoys for the use of vessels of war stationed here.

Trade.—The trade, which is small, is principally in rubber, gum, hides, palm oil and kernels, and guano has been found on one of the islands.

Anchorage.—Vessels may anchor a short distance off the mole in 11 fathoms water, over soft mud and most excellent holding ground. Vessels of war usually anchor southward, and merchant vessels northward of the mole.

Directions.—Mao bank, which uncovers at low water, and a shoal with a depth of 6 feet over it, situated one mile eastward of it, both of which are at the entrance to port Beaver, may be passed to the southward, by keeping the south points of Biafares island in line, bearing $E \frac{1}{2} N$. In passing up the channel leading to Bulama it is preferable to keep on the Biafares shore, which has fewer outlying shoals. There is a channel, between Calypso island and the coast, used by coasting vessels between Bulama and Bissao.

Bolola river, known to the Portuguese as Rio Grande de Guinala, is reported to be navigable for a distance of 450 miles, the distance between the head of this river and that of the Gambia being accomplished on foot in a few days. There is very little trade on the river.

The main channel of the river, known as Buba river, lies southward of Bissagua island and all danger will be avoided by keeping in mid-channel and well clear of the points. A depth of not less than 9 fathoms is maintained for about 16 miles above Bissagua island, when it decreases to about 20 feet, over mud, which is found off the factories situated on the left bank of the river.

Early in 1890, a yacht, drawing nearly 14 feet water, proceeded up the river and anchored in 7 fathoms water, about 7 miles below Buba, which is a Portuguese station, having a commandant and a few soldiers.

KANABAK REACH.—At the confluence of Bolola and Bulama channels, Kanabak reach may be said also to begin, and the mid-channel course through it, as far as Barel point, is S.W. $\frac{1}{4}$ S. for about 15 miles. This point, the south-eastern extreme of Kanabak island, is higher than the rest of the island, being about 65 feet above high water, and is conspicuous from the perpendicular red rocks of which it is formed. A small rocky islet, about 10 to 12 feet above high water, is situated on the eastern side of the reach, opposite to Barel point, distant $4\frac{1}{2}$ miles.*

In most parts of Kanabak reach, the soundings will indicate a too near approach to the shoals on either side.

Kanabak island is moderately high, with an excellent soil of decomposed lava; and the cattle upon it, though rather smaller in size, are generally in finer condition than on the other islands of the Bijouga group. The eastern coast of the island may be safely approached by the lead, and everywhere offers a safe anchorage in from 8 to 10 fathoms water, with good holding ground, and within a couple of miles of the shore.

Water.—Water may be plentifully obtained at Damiong bay, at the north-east side of Kanabak island, but it requires filtering or boiling before it is used, for the long pool from which it is baled is overhung by trees, and is therefore always filled with fallen leaves. Their decomposition gives it a disagreeable smell and taste, but it was freely drunk in the *Ætna*, without producing any ill effects. This pool lies parallel to the beach, through which it oozes, but it is kept at an uniform level by the abundant supply of some neighbouring springs. Wells were also dug at a little distance from the shore, and they supplied pure and clear water. Wood may be obtained on all these islands, but at Damiong bay it may be cut and embarked with great facility.

Anchorage may be obtained in about 7 fathoms water, over sand, with the north-east point of Kanabak, bearing about N. by E. and Barel point S.W. $\frac{1}{2}$ S.

Port Manel.—On rounding Barel point from the northward, a small cove will be perceived between it and the little island of Pomp, affording good anchorage, but inside a line joining Barel point and Pomp island it is very shallow. It is named port Manel, and is apparently the rendezvous of all the canoes belonging to that side of Kanabak island.

ORANGO CHANNEL.—This channel may be said to extend from Kanabak island to South breaker, and therefore to be upwards of 40 miles in length. Its least breadth, between the 3-fathoms line off Bronco reef and the shoals lying west of Cavalho spit, is 4 miles; but the distance between Pullam shoals and the ridges connected with the South breaker being

* See Admiralty chart :—Bijouga islands, sheet 3, No. 1,727; scale $m = 0.33$ inch.

13 miles, it offers a broad estuary through which the stranger may work with perfect security, provided he pays attention to the tides, has the leads in hand when nearing either side of it, and adopts the useful precaution of keeping a look-out from the masthead for ripples or discoloured water.

From abreast of Barel point a S.W. by W. course, due attention being paid to the tide, will lead out to sea through Orango channel.

Tides.—It is high water, full and change, in Orango channel at about 10 h.; springs rise 11 feet.

Tidal streams.—The ebb stream seldom exceeds $2\frac{1}{2}$ knots and the flood $1\frac{1}{2}$ knots an hour in velocity, except after heavy freshes in the rivers, the general direction of the flood stream being to the N.E., and the ebb to the S.W.; constant watching, and verifying the position of the vessel on the Admiralty chart, are imperative, as in some parts the tidal streams set across the channel and over the shoals.

Off the mouth of Orango channel the flood stream sets N.E., and the ebb S.W., for a duration of 6 hours each way, with rates of from half a knot to $1\frac{1}{2}$ knots per hour.

Jamber group.—The islands of Jamber, Cavalho, and Mel, situated on the eastern side of the channel are of nearly equal height; the latter shows some extent of a white sandy cliff. The northern extreme of this group is less dangerous to approach than the shoals on the western side of the channel; for Cavalho spit, lying north of Cavalho island, dries at low water, and almost always breaks, and the two small rocks near it, with 2 and 3 fathoms water over them, are less than half a mile from its north-west edge.

Jamber pass.—Between Mel and Jamber islands there is a narrow, deep channel, named Jamber pass, but it is not likely to be used by any stranger.

If circumstances should render the attempt necessary, the best time would be after the last quarter ebb, as many of the dangers in it would then be visible; but even then it would be prudent to send a couple of boats ahead, to mark the projecting points of the reefs on either side, which may at that time be readily perceived by the ripples caused by the tide.

H.M.S. *Ætna* passed through this channel, having just before completed its survey; the *Raven* also beat through the passage to the eastward of Jamber island with ease; but there are few occasions which would justify any large vessel in venturing through either of them. As 66 years have elapsed since these channels were surveyed, alterations have no doubt taken place; this fact should be borne in mind by strangers using the Admiralty charts.

Pullam island, so named from the lofty pullam trees growing on it, is the southernmost of the Jamber group, and the best landmark for the southern entrance of Orango channel. It is very small, but the reefs and foul ground by which it is surrounded extend for 6 miles to the south-westward, within the depth of 3 fathoms, and $4\frac{1}{2}$ miles to the north-westward; these shoals, known as Pullam shoals and Bicho bank, form the eastern side of the south entrance of Orango channel. The whole space occupied by Jamber group is full of dangers, and should be avoided, or very cautiously approached. In some places the depths decrease in a single cast of the lead from 24 to 5 fathoms, or even less.

Bronco reef.—Along the western side of Orango channel there are several dangers. Bronco reef, on part of which there are but 6 feet at low water, with 8 and 16 fathoms within 2 cables, lies $5\frac{1}{2}$ miles, E. $\frac{1}{2}$ N., from cape Cameleon, and is nearly a mile in length. A quick leadsman will give sufficient warning when approaching this reef, but in clear weather Barel point, kept half a point open to the eastward of Sueste point, the south extreme of Kanabak island, bearing N.E. by E. $\frac{1}{4}$ E., will lead east of it in deep water.

Pipon patch lies west of the above line of bearing, and, though having 12 feet water over it, may be safely approached by the lead; its eastern extreme is situated $2\frac{1}{2}$ miles south-west of Bronco reef.

Orango island, the largest of the Bijouga islands, is inhabited; seen from the South at a distance it appears as two separate islands.

Cape Cameleon, the south-east extremity of Orango island, is of a yellowish colour and moderate height; it is readily recognised when seen from the southward.

Cameleon reefs project, in a south-south-east direction, nearly 2 miles from cape Cameleon; but being far within the fairway track through the channel, no vessel is likely to approach them nearer than 10 or 12 fathoms water, in either depth she would tack.

Orango reef, on which the sea always breaks very heavily, extends to the south-west for 10 miles from cape Cameleon. The ground shoals somewhat suddenly up to its eastern edge, the tides set rather sharply round it, and in some places across it, but the appearance of the broken water on it is quite enough to keep all vessels at a distance.

Ætna patches.—At a distance of 18 miles W.S.W. from cape Cameleon and 10 miles W. $\frac{1}{2}$ S. from the tail of Orango reef, there are several long ledges of rocks, and at 3 miles farther to the westward some sand-banks, which dry at low water, are named the Ætna patches.

South breaker.—To the southward of these shoals there are other banks and dangers, amongst which no vessel should venture; and at 10 miles south of Ætna patches there is a shoal on which the sea at all times breaks heavily. It is believed to be at the southern angle of the great triangular bank on which the Bijouga islands stand, and when made by vessels approaching from the southward, serves for a guide to the Orango channel or for a point of departure to those that have come through it from the northward.

Its southernmost head, of 4 fathoms, is situated in lat. $10^{\circ} 39'$ N. and long. $16^{\circ} 9'$ W.; it is 22 miles southward of the nearest land (Orango island); 28 miles W. $\frac{5}{8}$ S. from Pullam island; and the course, from a position 4 miles south-east of South breaker to the south edge of Orango reef is N.E. $\frac{1}{2}$ E. for a distance of 20 miles. Though no dangers were discovered to the southward of South breaker, yet there are some suspicious soundings; and as detached rocks and isolated shoals are numerous in this vicinity, the mariner is advised not to round it in a higher latitude than $10^{\circ} 35'$ N.

Alcatraz island lies S.E. $\frac{5}{8}$ S., distant 26 miles from Pullam island; it is a volcanic rock 40 feet in height, traversed by deep fissures, and is the abode of innumerable boobies, whose eggs are very good eating; the birds have caused a guano deposit. Wreck island, low and sandy, lies one mile south-west of Alcatraz island, with shoal water between them. Reefs and foul ground extend to the southward from Alcatraz island for 7 miles, and for a distance of 5 miles to the westward; the western portion, known as Alcatraz reef, partially uncovers. In 1858 H.M.S. *Spitfire* struck on a shoal with 6 feet water over it, lying S.S.E., distant $1\frac{1}{2}$ miles, from Alcatraz island.

Anchorage.—The French vessels which examined the Cassini river in 1886, anchored south-east of Alcatraz island, in about 16 fathoms water over sand and mud, and a very uneven bottom. Anchorage was also taken up north of the island in a depth of $5\frac{1}{2}$ fathoms, over sand and broken shells and an uneven bottom, but neither of these anchorages could be considered safe during the winter months.

Unsurveyed coast.—The extent of coast between the Bolola and Componi rivers does not seem to have been visited by either of the Portuguese explorers or by the French or English surveyors. It is so low as to be seldom visible to vessels proceeding through Orango channel to Bissao.

This unknown coast, extending from Tombali point to Tristao islands, occupies a space of about 40 miles in length, and lies from 10 to 20 miles east of the Jamber and Alcatraz islands, and those reefs which have been already described.

Several rivers intersect this coast, the northern being Tombali river which is about 3 miles in breadth at its mouth and is said to have depths of from $9\frac{3}{4}$ to 16 feet on its bar.

CASSINI RIVER.—The entrance to this river, which is situated about midway between Kanabak reach and Componi river, was partially examined by the French in 1857 and again in 1886; it is obstructed by a great number of islets and sand-banks which the latter examination show to have changed greatly since the former. On the southern bank of the river, at 12 miles within the entrance, are the factories of Biquese and Cassini off which vessels anchor.*

The country is rich in timber, and all the produce of Senegambia is to be found here; landing in the river is usually very easy.

Samba and Séne banks, off the entrance, are sandy islands, difficult to distinguish at low water from the adjacent banks, which then uncover; breakers extend for a distance of fully 3 miles south of Séne bank. The channel named Pilots passage is blocked at its northern end, but a channel appears to exist on the western side of Dialmath passage in which the depths at low water were found to be from 5 to $6\frac{1}{2}$ feet.

If intending to enter the river it would be prudent to anchor near Alcatraz island and endeavour to obtain a pilot, and to make the attempt near low water as then the banks show, but this river cannot be approached with winds from the S.W.

The river Casset discharges between Katak island and the western of the Tristão islands, about 10 miles south of the entrance to Cassini river; it is merely an arm of the sea, with passages round the Tristão islands communicating with the Componi river. On the north-west side of the Triatão islands is the village of Kakich, to the north of which the French post of Répin is situated.

Componi shoals.—These shoals form the western side of the bay, which receives the waters of the Componi and Nuñez rivers; they terminate to the southward in Conflict reef.

Conflict reef.—This extensive reef is composed of numerous rocky and sandy dangers, some above and others below water. From the reef two long and dangerous prongs project, one to the southward and the other to the westward, and vessels should approach them very cautiously either at night or in thick weather. The south edge of the western prong, where it terminates in 5 fathoms water, lies in lat. $10^{\circ} 22' N.$ with Alcatraz island bearing North distant 16 miles, and cape Verga S.E. by E. $\frac{1}{8}$ E. distant 48 miles; the extreme of the southern prong bears S.E. by E. $\frac{5}{8}$ E. distant 12 miles from the western prong.

* See Admiralty chart :—Africa, West Coast, Sheet vii., cape Roxo to Isles do Los, No. 600; scale $m = 0.13$ inch.

Rocky head.—This dangerous shoal, lying 5 miles S.W. by S. from the extremity of South prong, has 15 feet water over it, from which Gonzalez island bears E. $\frac{5}{8}$ N., distant 26 miles.

CAUTION.—As other isolated knolls may have escaped the vigilance of the sounding boats, no vessels without great precaution should borrow on Conflict reef within a depth of 14 fathoms, especially on the line of its apparent prolongation.

The same vigilance should be exercised in every part of the bight, between Conflict reef and cape Verga, and when in the offing of that bight a vessel, working along the coast, will perhaps find it more prudent, during an adverse tide, to anchor instead of persevering in making a number of boards, which can avail but little against the stream, but which will expose her to the chance of picking up some undiscovered pinnacle of rock.

Gonzalez island.—The small island of Gonzalez, forming the south-eastern point of the entrance into river Nuñez, situated about 23 miles east from the south prong of Conflict reef, may be seen from the deck of a vessel from a distance of about 6 miles. Broat and Dapecará are two other islands to the northward of Gonzalez, and between them and the mainland there is a narrow channel, named by the natives Broat river.*

Gonzalez flat.—These islands are fronted by a dangerous flat of rocky and gravelly ledges, $1\frac{1}{2}$ miles in breadth, and extending 8 miles south-westward of Gonzalez island. One part of this flat, situated 4 miles south-west of that island, dries 6 feet at low water, and shows its bare volcanic structure for three-quarters of a mile in length; several shoals in the vicinity of this reef break during a fresh breeze.

COMPONI RIVER.—The entrance to this river is between Conflict reef and the extensive banks and shoals extending about 13 miles south-west of the coast between Componi and Nuñez rivers: the main channel trends N.N.E. and S.S.W., but owing to frequent changes in the depth, the navigation is difficult and dangerous.

From South prong of Conflict reef, the entrance to Componi river bears N.E. by E. $\frac{1}{4}$ E., distant 21 miles; a portion of the bank on the western side of the entrance always breaks.

Componi river may be ascended for a considerable distance, but owing to the difficulties attending the navigation of the entrance it is unfrequented.

Tides.—It is high water, full and change, in the Componi river at 10 h. 0 m.; springs rise 15 feet, neaps $11\frac{1}{2}$ feet.

Coast.—Between Componi and Nuñez rivers are situated the mouths of two unfrequented rivers, the eastern of which is known as Kassagua river.

See chart No. 601.

* See Admiralty plan :—Nuñez and Componi rivers, No. 1,562; scale, $m = 1.0$ inch.

NUÑEZ RIVER, the entrance to which is situated 10 miles south of Componi river, has been traced to its source, about 50 miles inland. On its banks are established numerous French factories, the principal of which is Victoria or St. Eugenie, situated on the northern bank at 13 miles from the entrance; alligators abound in this river.

Communication.—There is communication with Sierra Leone by means of a small steamer.

Coal and supplies.—Coal, in small quantity, might be procured at Belair factory. Cattle and sheep may be bought, the former of good quality and cheap. Spring water is seldom to be obtained, but the river water is fresh.

Talabuncha point, the northern entrance point of Nuñez river, is elevated and thickly wooded, appearing to be detached from the adjoining land. A bank of muddy sand, uncovered in many places at low water, extends 2 miles, and a prong of shoal water, with depths under 5 fathoms, 4 miles, south-west from Talabuncha point.

Broat and Dapecará islands, on the southern side of the entrance, are covered with tall trees, their shores being fringed with mangrove bushes. Several rocks, above water, lie off the north-west extreme of Broat island.

Buoy.—An iron buoy painted red is moored (1896) in 5 fathoms water $2\frac{1}{4}$ miles west of Bencer point, the north point of Broat island. *See* Caution; buoyage, page 33.

Making the land.—Vessels bound into Nuñez river should endeavour to make the high land of cape Verga, *see* page 299, but this cannot be safely done unless the weather be sufficiently clear to render it visible from a distance of more than 10 miles; for at 8 miles to the westward of the cape there is a long dangerous shoal, named Verga ridge, lying nearly parallel to the shore, and having, in some parts, only 9 feet water over it. Even in clear weather the cape should be very cautiously approached, as the soundings in the offing have not been closely examined.

Directions.—Whenever cape Verga can be distinctly made out by a vessel approaching from the south-west, a direct course may be steered towards the mouth of Nuñez river, but a vessel coming from the north-westward should take a departure from Alcatraz island, and endeavour to sight the breakers on the prongs of Conflict reef.

By keeping on the parallel of $10^{\circ} 20' N.$, till the meridian of $15^{\circ} W.$ is reached, the vessel will have passed between Conflict reef and Rocky head, and may then steer for Gonzalez island, which will generally be seen from the deck when distant about 6 miles.

See chart No. 1,562.

At every cast of the lead the navigator must be prepared for great irregularity in the soundings, and should, under manageable sail, keep the leads constantly going. If Gonsalez island can be approached on an East course, the water will suddenly deepen to 10 or 12 fathoms at 6 or 7 miles from that island, and will again quickly shoal to 7 fathoms, but by this time the land will be distinctly seen, when haul in towards the mouth of the river, steering about N.N.E. Strangers are not recommended to enter Nuñez river without a pilot.

The reefs off Dapecará island extend farther to the westward than marked on the present charts; Sand island, in line with Zebre point, bearing about N.E. $\frac{1}{2}$ E., leads clear to the westward of them.

The direction to "keep in the mud," which would be almost sufficient to guide a vessel in all the rivers in this vicinity, is at the mouth of Nuñez river of more than common value from the shifting nature of the spits and sand-banks, as they yield alike to the floods from within and the gales from without.

Entering the river in a steam-vessel of about 14 feet draught, bring cape Verga to bear S.E., and Gonsalez island N.E. $\frac{1}{2}$ E., which will place the vessel $1\frac{3}{4}$ miles south-westward of the south-west edge of the bank extending from Gonsalez island; then steer N.N.E. $\frac{3}{4}$ E. for 12 miles, or until the break between Gonsalez and Broat islands bears S.S.E.; then alter course to N.E. by E. $\frac{1}{8}$ E., looking out for the reefs off Dapecará island and the rocks reported in the vicinity of the line of this course, until the centre of Sand island appears in line with Talabuncha point, bearing about N.W. by W., when the vessel should be about half a mile south-eastward of Sand island, in 6 or 7 fathoms water, and may anchor, unless intending to proceed further up.

Sand island lies at the entrance of Nuñez river, between Talabuncha and Talabajli points. It is the head of the shoals that form the western side of the channel, and, from the shifting nature of the sands, has at different times assumed various dimensions. In 1896 it was described as being low, composed of yellow sand and always uncovered, but not usually to be distinguished until after the channel of the river has been entered: a portion of the bank, extending south of it, covers and uncovers the remainder being marked in places by breakers.

Village point, 5 miles above Sand island, has three large pullam trees upon it that may be seen for a distance of 14 miles.

Anchorage.—A good berth is in 7 fathoms water, with Sand island in line with Talabuncha point bearing N.W. by W. distant half a mile.

To proceed up the river.—From a berth half a mile south-east of Sand island, a N.E. $\frac{1}{2}$ N. course for 5 miles will lead up nearly in

See charts Nos. 1,562, 600.

mid-channel to abreast Village point, from this the channel of the river lies on a line joining Village point and the north point of Long or Devil's island.

Long or Devil's island, situated about 4 miles above Zebre point and surrounded by a bank which partially dries, divides the river into two channels, that to the eastward being shallow. The channel lying to the westward of the island is narrowed by a bank of sand and rocks extending off the west bank of the river, and although depths of from 23 to 26 feet will be found in the channel, the tidal streams run so strongly that it would be prudent to buoy the channel or to have a boat ahead.

After passing the island, course may be shaped for Victoria, keeping towards the western bank of the river, but about midway between that place and the north point of Long island a bar of mud, with from $9\frac{1}{2}$ to 13 feet at low water over it, crosses the river, and when nearing Victoria a shoal extends off the mouth of the Tessagua river.

Victoria consists of several French factories and a native village, and landing may be easily effected at high water.

Above Victoria the breadth of the river decreases considerably, and the course is generally mid-channel, but in places rocks extend from the banks, and at one spot not more than $9\frac{3}{4}$ feet will be obtained at low water. There are several villages on the banks, the principal factory on the river being at Belair, a short distance above Kassakobuli, where there is a small coal store.

Ropass factory is on the north bank of the river, which forms a reach just above it. There is a flat of rocky ground, with about 6 feet water over it, extending from the southern shore nearly across to Ropass, which is impassable, except at high water. Vessels should anchor in the centre of the stream about a quarter of a mile below Ropass, and if to remain should certainly moor. Higher up the river it is necessary to moor head and stern, laying a stream anchor out astern against the flood.

Above Ropass, the river, gradually narrowing, presents no dangers as far as Walkeria, a distance of about 10 miles, it being only necessary to keep in the middle of the stream where the soundings vary from 16 to 19 feet over soft mud. Walkeria, the ordinary residence of the king of Landumas, lies on the south bank; some rocks in front of the villages serve as a landing place. There are depths of from 10 to 16 feet here, but the river is too narrow to afford swinging room.

Above Walkeria are the villages of Kasasi and Boké the latter the last village on the river; between it and Walkeria the channel is barred in two places, with scarcely depth for a boat at low water, so that only vessels drawing 6 feet or less water can reach Boké at high water.

Boké is one of the largest villages on the river, and is visited by caravans; it has several factories, and is situated on a slope of the hills

See chart No. 1,562.

amongst which the river has its source some 8 miles above, but boats can only ascend about 2 miles above Boké, the river beyond being only navigable for canoes.

The wet season commences in May and ends in September, during which time the stream of the river is very rapid, and towards the close of the season, as the water subsides, the Nuñez is very unhealthy.

Anchorage may be obtained in Nuñez river off Victoria, 13 miles from Sand island, in from 16 to 19 feet water over mud, in the middle of the river; or off Ropass factory, 35 miles from Sand island, in $4\frac{1}{2}$ fathoms with centre of Ropass bearing N. by E.

Leaving Nuñez river.—The converse of the mode of entering will be found to conduct a steam-vessel of 14 feet draught out in safety. A slight allowance must always be made for the set of the tidal streams, which do not quite follow the direction of the channel, the flood setting a little northward of N.E. and the ebb a little southward of S.W.

Tides.—It is high water, full and change, at the entrance of Nunez river at 19 h. 45 m.; springs rise about 17 feet; neaps $11\frac{1}{2}$ feet; neaps runs 8 feet.

During February the tide in the upper part of the river was found to ebb 8 hours and flow 4 hours, the rise being about 8 feet.

Tidal streams.—At the entrance of the Nunez river the flood sets N.E. and ebb S.W. at rates of from 2 to 3 knots an hour. West of Talabuncha point the flood sets in a northerly, and ebb in a contrary, direction.

KAPPATCHES RIVER.—At about 5 miles E.S.E. from Gonzalez island the entrance to Kappatches river will be seen; but as at the time of the survey there was only a depth of 2 fathoms at 4 miles in the offing, within which the sea broke heavily, and the volume of water appeared to be small, it was not considered worth the labour or risk of further examination. It is, however, said to be a trading river, the traffic being carried on by canoes and local vessels, drawing not more than 4 feet.*

Verga ridge.—The coast from Gonzalez island to cape Verga forms a wide bay, with such shallow water in it that no vessel should attempt to enter it; at about $7\frac{1}{2}$ miles W.N.W. from the cape, Verga ridge terminates on a depth of $2\frac{1}{4}$ fathoms, after extending, without intermission, for 16 miles in a S.S.W. direction from the mouth of Kappatches river; it forms in either side two open bights, in which vessels should be careful not to get embayed, and has possibly some off-lying shoals.

Cape Verga cannot be mistaken, for, unlike all the adjacent shores, it rises at once from its base into high land, and when seen from the south-

See chart No. 1,562.

* See chart No. 600.

ward, in connection with a conspicuous eastern range of hills, is one of the most remarkable landmarks on the whole coast. It terminates in a rocky point inaccessible to boats, but with no off-lying islands or mangroves.

South-east of cape Verga the shore, resuming its low and swampy character for a distance of 17 miles so far as the western entrance of the river Pongo, is fronted by a shallow bank, the 3-fathoms edge of which, for a considerable distance, lies 7 miles seaward of the beach.

When cape Verga bears East distant 13 or 14 miles, two conical elevations, lying about $1\frac{1}{2}$ miles north of the cape, will be seen; the eastern of these is isolated and shaped like a sugar loaf, the western is the commencement of a chain which terminates, in the interior, in an isolated hill with two summits close together.

Banks.—H.M.S. *Thrush*, 1895, obtained soundings of from 10 to $11\frac{1}{2}$ fathoms between positions in lat. $9^{\circ} 43' N.$, long. $14^{\circ} 46' W.$, and lat $9^{\circ} 41' N.$, long. $14^{\circ} 41' W.$

PONGO RIVER.—The Pongo, like the Salum, is an arm of the sea extending a considerable distance inland, and diverges near its mouth into several branches. The most considerable of these are known as the Sand bar and Mud bar, besides which there are three other channels, two lying north-west of Mud bar and one south-east of Sand bar; canoes pass freely from one to the other, by keeping within a line of breakers, which fronts the shore at the distance of about a mile.*

Mud bar lies S.E. $\frac{1}{2}$ E., distant 17 miles from cape Verga, and this entrance to the river is two-thirds of a mile wide between Goru and Jili points.

Greatest draught.—Pilots may sometimes be obtained, but if not, though there is a scarcity of marks, yet by attention to the constant breakers on either hand the channel can hardly be mistaken, and may, if necessary, be attempted at three-quarters flood by any vessel drawing less than 15 feet water.

This bar is composed of soft mud, into which the lead sinks deeply, and through which a vessel with a commanding sea breeze would no doubt easily drag more than a foot in depth.

Directions.—Being in 4 or 5 fathoms water, or at a distance of 7 or 8 miles in the offing, bring the entrance of the river to bear N.E. $\frac{3}{4}$ E., which course will lead midway between the two sand-banks that extend $3\frac{1}{2}$ miles outside it, and if exactly preserved will cross the bar into depths of from $3\frac{1}{2}$ to 4 fathoms; but it must be recollected when leaving the river by Mud bar, that although the flood sets directly *in* through the channel, yet the ebb sets obliquely *out* to the southward, across the easternmost of the two banks at the entrance, both of which are steep.

* See Admiralty plan :—Pongo river, No. 1,675; scale $m = 0.9$ inch.

These directions, if the compass be good and the lead kept quickly going, will conduct any manageable vessel across the Mud bar, if the maxim *keep in the mud* is borne in mind.

Jili point, which forms the south entrance point, terminates rather abruptly, and has on it a single bush; when it bears a little eastward of N.E. by E., a clump of bushes will be seen beyond the point. These objects kept in line lead in the deepest water across the bar; then on the first east of 3 fathoms, haul immediately into mid-channel.

Or, perhaps, the following marks may be more readily distinguished:—Goru point, on the north side of the entrance, terminates in a row of palm trees; when their southern extreme bears about N.E. $\frac{1}{3}$ E. a second row of palm trees will be seen just opening to the eastward of them, and the two rows kept in this position will lead in the deepest water between the two outer banks. When they are passed, steer midway between the points of entrance.

Sand bar.—The Sand bar mouth of the river Pongo lies about 7 miles south-eastward of the Mud bar. Observation point, which forms the north side of the entrance within the bar, terminates rather abruptly, and has a village about three-quarters of a mile west of it; south of the village the shoals extend about three-quarters of a mile, but east of the point the shoal water is distant about two cables; Murura point, the south entrance point, is more shelving.

Both east and west of the bar, the great bank with which it is connected extends considerably farther from the shore, and the many shallow spots on it give the appearance of an almost continuous line of breakers, so that no one who approaches it when the tide is low will feel any inclination to attempt to cross it much before the top of high water.

Buoys.—In 1895 three buoys were laid down to mark the entrance to the Sand bar. A buoy, painted red, moored in 18 feet water to mark the north extremity of the South bank. A buoy, painted red and black in checkers, in 27 feet water in the middle of the channel, and a buoy, painted red and black in checkers, in 14 feet water, north-east of the bar, but no reliance should be placed on finding these buoys in existence. *See Caution; buoyage, page 33.*

Greatest draught.—Neap tides rise here 9 feet, and therefore, if there be a moderate breeze and no great swell, any vessel drawing less than 15 feet may venture in at three-quarter flood, if no pilot offers himself, by attending to the following directions.

Directions.—The entrance to the river, about a mile wide between Observation and Murura points, is fronted by a dangerous bar, the channel being about $3\frac{1}{2}$ cables in width, and the least depth 9 feet at low water, spring tides.

At three-quarters flood (remembering that the flood stream sets obliquely across the channel to the northward), and with leadsmen in both chains, bring Observation point to bear about N.E. by E., and keep it on that bearing till the first cast of 16 feet (allowing for the rise of the tide) shows that the vessel has arrived on the outer edge of the bar; then alter course, so as to bring mount Mayondi in line with the commencement of the white beach of Murura point, bearing E.N.E.

Following this course, for 4 miles, leads over a depth of about 14 feet at low water, and into a narrow vein of deeper water with depths of from $3\frac{1}{4}$ to $4\frac{1}{2}$ fathoms, which extends for a distance of $2\frac{1}{2}$ miles, and when the extreme of the land, to the northward, bears N.W. $\frac{3}{8}$ N. the bar proper on which the depth is about 9 feet, will be reached.

After passing the bar the water will deepen to $5\frac{1}{2}$ fathoms and Observation point should be kept a little on the port bow, keeping a good look-out for knolls of sand, which sometimes form in the channel. When between Observation and Murura points good anchorage may be taken as convenient near the former point.

If the buoys are in position the outer (red), and second (chequered) should be left on the starboard and the inner or bar buoy on the port hand.

Anchorage off Pongo river.—H.M. vessels of war usually anchor off the Sand bar in 7 or 8 fathoms water, but in thick weather it is difficult to distinguish the entrance from that of the Mud bar. The south entrance points of each, being formed by bluffs, are very similar. The leading feature, when not obscured by clouds, is mount Mayondi, a truncated cone with gently sloping sides, 1,300 feet high, and the most conspicuous of a chain of inland hills. Failing mount Mayondi, Observation point will serve as a guide.

Vessels, waiting to cross the bar should anchor in about 4 fathoms water with mount Mayondi bearing E.N.E.

CAUTION.—Although partial examinations have been made of the entrances to the river Pongo since the Admiralty survey in 1830, there is good reason to believe that every gale and every rainy season alters the form and extent of all their banks and shoals. Therefore neither Pongo nor Nunez rivers should, under any circumstances, be entered by a stranger without a pilot.

Boffa.—The settlement of Boffa, situated on the north bank of the river, 7 miles above Observation point, is the residence of the Governor of the Pongo district, and the central post of the Customs; here there is a Roman Catholic Mission, and a road to Thia, which is the residence of the King of Sussus.

On the opposite bank of the river, at the village of Guémeyré, the French Company have offices, and this is the starting point of caravans to the interior. Nearly a mile above Guémeyré is the entrance to Marigot de Bania or Tua creek only available for boats.

Supplies.—The country produces almonds, palm oil, kola nuts, rice, and wax, but the resources this river affords are trifling; neither bullocks nor vegetables are to be obtained. Other stock is scarce, and only to be procured in exchange for rifles, ammunition, tobacco, handkerchiefs, &c., money being of no use. For water, which is not good, boats must proceed a long way up; but wood may be easily procured at Observation point, as the trees there grow nearly to the water's edge, and boats can lie conveniently alongside the sandy beach.

Anchorage as convenient may be obtained off Boffa in about 26 feet water, over mud.

Directions.—Vessels proceeding to Boffa take the channel east of Big island, keeping towards the shores of Murura and Quito islands until past the bar, extending south from Big island, and afterwards maintaining a mid-channel course.

Dominghia, where there are several factories, is about $1\frac{1}{2}$ miles above Boffa, and on the same bank of the river, and about a mile above this the river makes a sharp turn to the south-west round Sarabelli, on the south bank, where there is a village. Half a mile above this the river is divided by Ile du Diable, and has on the right bank the village of Bankoia and on the left the entrance to the river Patala, on the banks of which are several villages; in the bend of the river below Ile du Diable the tidal streams run strongly.

Above Ile du Diable the river has a northerly direction, and, at a distance of about 5 miles, opens out into a marshy basin, studded with muddy islands, amongst which navigation is impracticable. On the shores of this basin are the villages of Bengalong, Farringhia, and Sano, and here the water is salt.

Yanguya bar, situated about 4 miles south-east of the entrance to the Pongo river, is impracticable; but the Marigot de Yanguya, which separates Murura and Quito islands, has depths of from $1\frac{1}{4}$ to $4\frac{1}{4}$ fathoms water in it. Five miles further south-east is the Tabuia bar, practicable for small craft; about mile within the entrance, on the south bank, is situated the town of Tabuia, the residence of the king of Bagas, and here there are some factories.

The creek which separates Quito island from the mainland has depths varying from 6 feet to $5\frac{1}{2}$ fathoms, and on its banks are numerous villages;

about mid-way between Tabuia bar and the junction with the Pongo river is the Marigot de Bakia, which extends to the north-east, and at its junction with the creek there is a large anchorage space.

Tides.—It is high water, full and change, at the entrances of Pongo river, at 7h. 30m.; springs rise 12 feet, neaps $9\frac{1}{2}$ feet; neaps range 7 feet.

At Boffa it is high water, full and change at 6h. 50m.; springs rise $16\frac{1}{4}$ feet, neaps rise $9\frac{3}{4}$ feet.

In the marshy basin, at the head of the river, the rise is from $3\frac{1}{4}$ to 5 feet.

Tidal stream.—The strength of the tidal streams is about $1\frac{1}{2}$ to $2\frac{1}{2}$ knots an hour, except during the period of floods (July–September) when it is much greater.

Current.—Off the Pongo river, during the month of October and November, the current has been observed to set N.E. and E.N.E. for several days in succession.

DEMBIA or BRAMEYA RIVER.—From the sand bar of Pongo river the coast, formed by a low shore fringed by mangroves with a detached line of breakers, trends south-east for a distance of 20 miles to the mouth of the river Dembia.*

This river divides into two arms at about 10 miles from the sea, enclosing the island of Konebombi between them. The northern arm empties itself into the sea, but it is reported to be only navigable for boats. The southern branch flows into Sangaria bay.

At the junction of the two arms is an island named Kakunzu, near the mouth of the southern arm, which must be left on the port hand when going up the river. Near this island is a rocky ridge named the Kakunzu reef, over which vessels drawing 10 feet may pass at half tide. With this exception the channel is clear and lies in midstream. Both banks of the river are covered with thick mangrove forest, intersected by many creeks only accessible by flat-bottom boats; alligators are very numerous.

Vessels, drawing 16 feet water, can navigate the Dembia as far as the town of Brameya, some 15 miles above the Kakunzu reef, where there is an extensive rocky ridge across the stream, forming the Bumia falls, which completely bars further navigation.

According to the statements of the white residents at Debreeka, the Brameya is navigable above the falls as much as 160 miles for vessels drawing 10 feet.

Brameya or Bumia, the capital of the district of the same name, is situated on the right bank of the river just below the falls. There are English and French factories on both sides of the river, belonging to the head settlements of the Europeans on the Debreeka river, and regular

See chart No. 1,675.

* See chart No. 600.

communication is kept up between them by boats and two small steam-vessels of 100 and 30 tons, drawing 10 feet and 7 feet respectively.

Kakulima mount.—The Paps of Sumba lie East from the mouth of Dembia river, and on that bearing this mount will be easily recognised; the Paps rise from a range of high land to 1,700 feet above high water; and mount Kakulima, 11 miles farther to the south-east, attains the height of 2,900 feet; it is a conical peak with steep and regular sloping sides. This group of hills covers a large space and may be seen from a great distance.

Konebombi bank.—One side of a triangular mud bank, which dries at low water, extends from the south entrance point of Dembia river, about 5 miles to the south-westward, the edge of the bank then trends towards the shore of Konebombi island, the western angle lying N.W. $\frac{1}{2}$ W., distant 6 miles from Alligator point, the south extreme of Konebombi island.

Sangaria bay.—Konebombi island and bank form the north-west side of Sangaria bay, into which the river Debreeka pours the water of the mountainous region above mentioned. The south-east side of the bay, 20 miles in length, extends from the mouth of that river to Tumbo point, south-westward of which, distant 2 miles, are situated the Isles do Los.

Extensive flats and shoals project into the bay from each side, leaving only a $2\frac{1}{2}$ fathoms channel between them at low water; the shores of the bay are so intersected with creeks that they form a series of islands, some of which are forming while others are disappearing; great caution should be exercised when crossing the entrance to Sangaria bay.*

Jatia river.—This is another river flowing into the Dembia (Brameya) near the point where it opens into Sangaria bay. The town of Jatia, the capital of the Kabitai district, is situated on the southern bank about 6 miles from its mouth. At Jatia the river divides into two branches, that on the right leading to the town and falling dry at low water.

The flood tide sets in here about $1\frac{1}{2}$ hours later than at Alligator point, and runs with such strength that a pilot is necessary.

Depth.—The river appears to be navigable for vessels drawing 10 feet as far up as Jatia.

DEBREEKA RIVER.—Debreeka river divides into two branches before entering the N.E. corner of Sangaria bay, enclosing Copperra island.

See chart No. 600.

* The depths marked on Admiralty chart No. 600, appeared to be generally correct; but the bank shown in the middle of the entrance of the bay was not seen by the officers of the German corvette *Ariadne*, nor is its existence known to the captain of a small trading steam-vessel, who has been navigating these waters for many years. Berlin, Annalen Hydrol., Heft VI. of 1885.

Above the junction of the two arms is a European settlement on the left bank, which is named Debreeka, consisting in 1888 of two English, one German, and two French factories.

Depth.—The southern arm is the deeper, and can be used by vessels drawing less than 10 feet water, at all times of tide; but the northern, which is shorter, is only navigable after half flood, as there are several banks and reefs near the upper point which dry in places at low water.

Only boats can navigate above the settlement, as the river shoals rapidly with many rocks and banks.

Debreeka is a commercial station; the caravans of the interior visit it in large numbers, bringing india-rubber, gum, skins, ivory, &c.

Supplies.—Oxen and sheep are to be procured; fruit is not abundant, but fish are plentiful in the river.

Directions.—Should a moderate-sized vessel wish to enter this river, bring mount Kakulima to bear East; and timing the run upon that course, so as to be as far in as the 4-fathoms line by half flood, proceed until abreast of Alligator point, the north entrance point, which should be passed at the distance of about 2 miles. When this point bears N. by W., alter course a little to the northward, so as to bring the extremity of the ridge, which lies westward of mount Kakulima, in line with the termination of the sandy beach on the south-eastern shore.

The water will now deepen a little, and passing Creek point, the south entrance point, by the lead, take up an anchorage at such a distance from the mouth of the river as may be convenient; or by sending a boat to mark the edge of the bank on the south side of the river, it may be entered without much danger. The water here is unfit for Europeans and very scanty, but wood will be found everywhere.

To proceed from the mouth of the Debreeka to Brameya, steer for Alligator point until Creek point bears S.W., and then alter course for the east point of the centre Konebombi island until the mouth of the Brameya opens out to starboard. This course leads westward clear of the banks extending from the south side of Bora-Banki, the island lying at the head of Sangaria bay.

Tides.—It is high water, full and change, in Debreeka river at 7h. 33m.; springs rise 13 feet.

Depths off shore.—The bottom along the whole of this coast, from Dembia river to the Isles do Los, under a depth of 10 fathoms is of soft blue mud, into which the lead sinks deeply; and when a vessel approaching from seaward arrives in 5 fathoms, the water will be found at times so thick on the surface as to lead one to imagine that the bottom is being stirred up. The muddy tinge, however, of the shoal water is of a much lighter cast.

CHAPTER IX.

ISLES DO LOS (IDOLOS) TO SHOALS OF ST. ANN.

 VARIATION in 1900.

Sierra Leone - - - 19° 15' W.

Decreasing about 1' annually.

ISLES DO LOS (a corruption of *Illas dos Idolos*, Isles of Idols).*—This group, belonging to Great Britain, consists of three moderately high islands, besides several bare rocks and reefs, situated two miles south-westward of Tumbo point, the east limit of Sangaria bay.

Remarks.—When approaching the coast in the vicinity of Isles do Los, it may be remarked that though a bank of 3 fathoms in some places extends to a considerable distance from the shore, yet the soundings are so regular as to give ample warning. A tumbling sea at times may prevail during a strong breeze, but as no gales (except tornadoes, which are of short duration and blow off shore) are experienced upon this coast, the mariner need never be alarmed, for there is generally good anchorage everywhere, and no long swell or current to force a vessel into danger.

Local Magnetic disturbance.—When navigating in the vicinity of these islands the compass is subject to local magnetic disturbance. As much as 6° of disturbance has been observed when approaching the anchorage of Tumbo, and nearly 3° one mile south of Runa or Crawford island.

Tamara or Futabar island, the westernmost and largest of the group, makes like two islands, and being 510 feet above high water, may be seen from a distance of 20 miles in clear weather. The island is thickly wooded, $4\frac{3}{4}$ miles in length, and about a mile in breadth, its curved form adds to the shelter it affords to the anchorage on the east side. Eastward of Topsail point, the south extreme of Tamara island, are situated two high conical rocks, the eastern of which is 4 cables from the shore.

There are three villages, all on the east side of the island; Futabar, where there is a spring, is near Barrette point, the north-east extreme of

* See Admiralty charts:—Isles do Los to Sherbro island, No. 601; scale $m = 0.25$ inches; and Isles do Los (Idolos), No. 395; scale, $m = 1.32$ inches.

this island. Bume is on the southern part and Rockbané about midway between the two.

Water.—The best water on Tamara island is to be obtained at the landing place on the east side, at one mile west of Barrette point, but it cannot be embarked after three-quarters ebb, and during the rainy season the swell at the anchorage renders watering with boats dangerous. Very good water may at all times be easily procured, from a pool 6 or 7 feet deep, at the beach under the north peak of Factory island, and also near Shark's nose point on the east side of that island.

Arethusa reef, on which H.M.S. *Arethusa* struck in 1811, projects about three cables from the northern extremity of Tamara island.

Shoal.—A shoal, on which the depth is 3 fathoms, lies with the north extreme of Tamara island bearing W. $\frac{1}{2}$ N. and the east extreme of Barrette point S.W. $\frac{1}{4}$ S.

Factory island, the easternmost of the group, is well wooded, and $4\frac{1}{4}$ miles in length, in a north and south direction, and in some places not more than a quarter of a mile across; it is concave on its western side, and forms the eastern limit of the anchorage. North peak, about half a mile from its northern end, is 430 feet above high water. Two small villages, named respectively Fanin and Mangor town, where a few fowls may be obtained, are situated in the northern part of the island. There is said to be a spring of fresh water at the south-east extremity.

In January, 1886, the only factory was a white house with red roof, near the centre, and towards the eastern side of the island, and northward of Kasso, the principal village, and residence of the Collector of Customs. Good landing may be effected at a small stone jetty abreast of the white house.

Cooper rock, awash at low water, lies 6 cables east of Dan or Cooper point, the south extreme of Factory island; a shoal with $3\frac{3}{4}$ fathoms water over it, lies two cables east of Cooper rock.

White island and Kid island, both wooded and nearly joined by a ledge of rocks, are separated from the south-west extreme of Factory island by a narrow channel, only available for small vessels.

Ruma or Crawford island, 300 feet above high water, is about a mile long, in an east and west direction, and lies nearly in the middle of the space enclosed by Tamara and Factory islands. Crawford shoals, which are extensive, extend for about 2 miles north-east from this island, and apparently block the passage between it and Factory island. There is a small village on the island, with about 20 inhabitants in 1896;

poultry and eggs may be procured, and there is a good beach on which to haul the seine.*

Position.—The observation spot is in a bay on the north side, in latitude $9^{\circ} 27' 24''$ N., longitude $13^{\circ} 48' 30''$ W.

Rocks.—A sunken rock lies about $1\frac{1}{2}$ cables south-west of the south-west extreme of Ruma island, and a rock above water lies near the shore, north of the highest part of the island.

Coral island lies nearly $1\frac{1}{4}$ miles S.S.E. from Topsail point, the south extreme of Tamara island; a shoal, with $2\frac{3}{4}$ fathoms water over it, extends about a cable north-east; and a rock, with less than 6 feet water over it, lies about 3 cables south-east of Coral island.

North Channel, between Barrette point, the north-east extreme of Tamara island, and the north-west extreme of Factory island, is nearly $1\frac{1}{2}$ miles wide in a S.E. by E. and N.W. by W. direction; the depth midway is 7 fathoms, but the entrance points should not be approached nearer than 3 cables.

Anchorage.—The anchorage between Tamara and Factory islands is in 5 fathoms water, with the north-west extreme of Ruma island, bearing about S. $\frac{1}{2}$ W., distant 6 cables.

Directions.—Vessels, intending to enter the anchorage between Ruma and Tamara islands from the northward, should bring the north peak of Factory island well open of the north extreme of Tamara island, bearing about S.S.E. $\frac{1}{2}$ E., and allowing for a tidal set of $1\frac{3}{4}$ knots an hour (whether flood or ebb), round the north extreme of Tamara island, at a distance of about a mile, to avoid Arethusa reef the shoal spit extending a third of a mile east of Barrette point, and the 3 fathoms shoal.

When the eastern extremity of Coral island is in line with the western extremity of Ruma island, bearing S.W., alter course on this leading mark, until south of Barrette point, when the marks should be kept a little open, or the vessel steered for the middle of the channel between Topsail point and Coral island, to avoid the shoals extending north-east from Ruma island.

South channel, between the reefs off Topsail point and Coral island, has a depth of 8 fathoms in mid-channel, but the western shore should not be approached nearer than half a mile when Topsail point

See chart No. 395.

* The sand-bank north of Ruma island is a suitable position for placing a vessel for examination of valves, copper, &c. H.M.S. *Alecto* (1896) was placed on the bank on the west side of the north-east extreme of the island and remained there for ten days cleaning the bottom; she was secured with a stern anchor and hawsers laid out to trees, but the shore should not be approached nearer than half a cable, as there is a fringe of rocks at edge of the beach at low water.

bears to the westward of N.W. by N.; the north peak of Factory island in line with the north-western extreme of Ruma island, bearing N.E. by E. $\frac{3}{4}$ E., leads in mid channel between Topsail point and Coral island, and when Topsail point bears W. by N., a course may be shaped for the anchorage.

Tides.—It is high water, full and change, at Ruma island at 6h. 35m.; ordinary springs rise 13 feet, equinoctial springs, 17 feet.

Tidal streams.—The flood stream sets to the N.E., and the ebb in contrary direction, with a rate of from $1\frac{1}{4}$ to $1\frac{1}{2}$ knots an hour at spring tides; if approaching from the westward it is advisable to enter by North channel with the ebb, and by South channel with the flood.

TUMBO CHANNEL.—Between the Isles do Los and the sharp low point of Tumbo there is a safe channel, available for sailing vessels drawing 12 feet, and much time may be saved by using it, provided the tide be favourable. The bottom being of mud, affords good anchorage if necessary. The shoal water extending from the north-east extreme of Factory island will be avoided by keeping Shark's nose open east of Mat point, the next point to the northward of it, bearing about S. by W.*

Amarante and Prudente shoals.—Amarante shoal with 2 fathoms water over it, and about 4 cables in length by 2 cables in breadth within the 3-fathoms line, lies $1\frac{2}{10}$ miles north-east of Amarante point; Prudente shoal, the position of which is doubtful, has also a depth of 2 fathoms; it is about $1\frac{4}{10}$ miles N.E. by E. of the northern end of the town of Konakri.

Depth.—Mail steamers, drawing about 19 feet water, use the Tumbo channel, and after passing the supposed position of Prudente shoal the deeper water appears to be on the eastern side, but avoiding the rocky ledge off the south-west end of Tumbo island. Unless bound to Konakri, or with some good reason for hugging the shore, it will always be advisable to pass outside the Isles do Los.

Tumbo island, flat, and separated at high water from the mainland by a narrow and rocky channel, about three-quarters to one-fifth of a cable in width, through which nothing but canoes can pass, has numerous rocky spurs fringing its coast. From the south-west point of Konakri one of these spurs, having on it a clump of mangroves, extends in a south-west direction for a distance of 3 cables, and forms the north-west side of Anse du Dragonnier.

KONAKRI.—The town of Konakri is situated on the west side of the island and the Government house, a square building, is visible from some

See chart No. 395.

* *See plan of Tumbo channel on Admiralty chart No. 395; scale m = 4.75 inches.*

distance; the factories are on the north coast with the exception of one at Bulbineh, on the north-east side of Anse du Dragonnier.

The port of Konakri, with depths over 3 fathoms, is in a basin nearly a mile in length in a north-east and south-west direction, with a general breadth of 2 cables; this basin, which lies parallel to the north-west side of Tumbo island at about 2 cables distant, is completely surrounded by the extensive bank extending north and north-west of that island; the entrance channel, from the southward, has a depth of 11 feet at low water, spring tides.

Communication.—The steamers of the following companies call monthly:—British and African Steamship Company, Chargeurs Réunis of Havre Fraissinet, of Marseilles, and Woermann of Hamburg. The steamers of the Compagnie de Cabotage de Senegal connect with the rivers of the south. There is telegraphic communication with Gorée, Sierra Leone, Senegal, Timbuktu, Wagadugu, Cape de Verde, Tenerife, and Cadiz.

A road to Farana, on the river Niger, is in course of construction; in 1897 it was completed to Timbo.

Coal and supplies.—Coal may be purchased from the French Company of Western Africa, fresh provisions, such as oxen, sheep, poultry, and eggs may be procured, but no vegetables; fish are bad, and there is no watering place.

Trade.—The principal imports are alcohol, clothing stuffs, ironware, and firearms, and exports india-rubber, palm nuts, coffee, and a small quantity of ivory.

Buoys.—Near the south entrance of the channel, leading to Konakri road, is a fairway buoy painted black and red in horizontal bands. From the buoy Government house bears E. $\frac{3}{4}$ N., distant 6 cables.

Two buoys, red to the eastward and black to the westward, mark the channel; from the red buoy Government house bears East distant about 4 cables; from the black buoy the same house bears E. $\frac{1}{2}$ S. 5 cables.

A red buoy is moored W. $\frac{3}{4}$ N., distant 2 cables from the extremity of the pier which is at the north side of the town of Konakri. See Caution; buoyage, p. 33.

Pilots.—Strangers should employ a pilot.

Telegraph cable.—The telegraph station is at the southern part of the town, the cable is laid in a north-westerly direction, passing about 2 miles to the northward of the Isles do Los.

Anchorage.—The anchorage, in not less than 23 feet at low water, is about $2\frac{1}{2}$ cables north of the jetty, but during the season of S.W. winds, from May to October, it is desirable to anchor more to the eastward, according to the vessel's draught, and, if remaining any time, it is recommended

to moor, as constant swinging would probably cause the anchor to foul; the holding ground is said to be excellent.

Anchorage may also be obtained off the entrance to the port, in from $4\frac{1}{4}$ to 6 fathoms water, with Government house bearing about E. by N., and the clump of mangroves on the rocky spur west of Anse du Dragonnier E.S.E., but this is not a convenient anchorage during the winter season, as the tidal streams and the sea greatly interfere with communication with the shore by boats.

Directions.—Proceeding to Konakri, from the southward, the north summit of Factory island in line with Campbell peninsula, bearing N. by W., until Kid island is in line with Dan or Cooper point, W. $\frac{1}{2}$ N. clears Cooper rock.

From this steer N. by E. $\frac{3}{4}$ E. until the north summit of Factory island bears N.N.W., when the course should be altered to N. $\frac{1}{4}$ W., until the Government House at Konakri bears East, which course leads to the buoys at the entrance of the harbour.

If the buoys are in position, the fairway buoy may be passed on either hand and the channel then lies between the two buoys, which mark it, keeping the red buoy in the northern part of the harbour a little on the starboard bow.

Should the buoys be adrift, Centre hill, on Factory island, bearing S.W. $\frac{1}{8}$ W., and steering N.E. $\frac{1}{8}$ E. for a remarkable wooded point at the bottom open west of Tumbo island, leads through the passage.

CAUTION in the approach to the anchorage off Konakri is necessary as the place is only partially surveyed.

Tides.—It is high water, full and change, at 6h. 38m.; springs rise 14 feet, neaps 7 feet.

Tidal streams.—The tides are very regular, but the streams are not so. The flood coming from the southward runs round the south-west point of the island, then N.E. through the port, attaining a rate of 3 knots an hour at spring tides; the ebb has a contrary direction. There is an eddy in shore about 200 yards wide at neap tides, and about half a mile at springs.

The tidal streams run strongly in the passage, the flood tending to set a vessel to the northward.

An ebb tide, especially at springs with a strong S.W. wind, causes a confused sea, resembling breakers, off the entrance which might be dangerous to boats.

COAST.—From Tumbo island the land takes an easterly direction for about 7 miles, forming an extensive but shallow bay, at the head of which

is an inconsiderable stream named Tanneneh river, accessible to canoes only.*

MANEA RIVER, situated about 12 miles east-south-east from Tumbo island, is, at low water, scarcely accessible to the smallest coasting vessels. The entrance is about 6 miles south-eastward from that of Tanneneh river, but the water between is very shallow; a mud-bank, which extends south-westward from the west point of the entrance of Manea river, is uncovered at low water, for a distance of about 2 miles from that point.

Least depth.—A similar mud-bank fronts the east side of the entrance also, leaving a channel between, about a mile wide, in which the depths are from 3 to 8 feet at low water.

Directions.—To enter Manea river it is only necessary to bring the western point of the entrance (while at the distance of 5 miles from it) to bear N.E. by E. $\frac{1}{2}$ E., and then steer towards it, until close to the northern mud-bank at the entrance, when a vessel may proceed along the edge of that bank, in a convenient depth, according to circumstances. The quantity of water discharged from this river must be very great, as the ebb tide runs out with great rapidity.

MOREBAIA RIVER lies about 18 miles S.E. by E. $\frac{1}{2}$ E. from the south extreme of Factory island, and about 7 miles north from Matakong island; and though its breadth within the entrance points nowhere exceeds half a mile, yet it is far more accessible than the Manea. The entrance is narrow, and the channel across the bar forms an elbow, which, to render it perfectly safe of approach, would require to be marked by two buoys, as the coast is destitute of good natural objects to serve as leading marks; the following directions, however, may be of use.†

The least water on the bar is $1\frac{1}{4}$ fathoms.

Directions.—In approaching the coast in the vicinity of Morebaia river, when its opening bears E. by N. $\frac{7}{8}$ N., distant about 9 miles, and Matakong island bears S.E. by E. $\frac{1}{4}$ E., there will be 6 fathoms water on black mud; from this position, keeping on an E. by N. $\frac{7}{8}$ N. course, the depth will decrease gradually, over a bottom of the same kind, to $3\frac{1}{2}$ fathoms at the entrance of the channel.

With the rounding of the land between the rivers Manea and Morebaia bearing N.N.E., the south-east point of the entrance E. $\frac{3}{4}$ N., and the centre of Matakong island S.S.E. $\frac{3}{4}$ E., the depth is $3\frac{1}{2}$ fathoms.

* See Admiralty chart :—Isles de Los to Sherbro island, No. 601; scale, $m = 0.25$ inch.

† See Admiralty chart :—Forikaria, Mellakori, and Tannah rivers, No. 614; scale $m = 0.7$ inch.

From this position steer N.E. by E. $\frac{1}{4}$ E. until the east entrance point of the river bears E. $\frac{1}{4}$ S., and then stand in towards this point, remembering that both flood and ebb streams set partially over the extensive shoals that form the south side of the channel; some of these, however, being dry at low water, and others nearly so at high water, their steep boundary is perfectly discernible.

In the elbow of the channel across the bar, the least depth is $1\frac{1}{4}$ fathoms at low-water, spring tides, but this depth continues only a short distance; and from the time of altering course to the eastward, or steering directly in, there will seldom be so little as 2 fathoms. Beyond the eastern entrance point, the depth varies from 4 to 6 or 7 fathoms, and for the distance of 7 miles up the river, it appears to be clear of all danger.

The village of Morebaia is situated in a creek on the south bank of the river, about $1\frac{1}{2}$ miles within the entrance point on that side.

Granite rock.—At about 3 miles within the east entrance point of the river a remarkable round mass of granite rock rises abruptly to a height of about 40 feet. It is about 400 yards in circumference, and situated near the shore on the eastern side; the natives assert that several similar masses are scattered about the plain, as far as the Sangari mountains, which, they report, are also composed of the same species of rock.

ASPECT OF COAST.—The contrast which the coast, in this vicinity, presents to the eye in different states of the atmosphere is very great. In clear weather the view of the fertile shelving hills in the Isles do Los; the stupendous features of the distant inland mountains; the plains covered with trees, and the beautiful little island of Matakong is highly interesting; while in hazy weather, nothing is visible but a low coast, fringed by mangroves, and enveloped in mist, with an indistinct opening of a river here and there, or perhaps a column of smoke rising from a native village.

Matakong island, about a mile long, and three-quarters of a mile broad, is situated 22 miles south-east from the Isles do Los; its beauty consists in the luxuriance of the trees, the verdure of those spots which have been cleared, and its gentle slopes, which render it a striking contrast to the low swampy tract of mainland opposite.

It was formerly the property of a merchant of Sierra Leone, and used as an establishment for rearing cattle, and is the central depôt for the trade in ground nuts carried on with the neighbouring coast, a factory being built on the north side. The island appears to be composed of lava, yet on its summit there are two large pieces of granite, which the natives assert have been artificially placed there.

In 1879 the Colonial Government erected a custom-house, barracks, and dwelling-houses for the officers. At the factory there is a crane to assist in loading boats and small vessels. At that time the wharf could only be used at high water.

Matakong island is surrounded by mud-banks and rocks in all directions, so that none but small vessels can lie at anchor within 2 miles of it. The channel which divides it from the mainland is nearly three-quarters of a mile broad, but dries at low water.

Depths off shore.—In the extensive bay between Matakong island and the Isles do Los there are no detached dangers. The coast is safe to approach, the soundings being regular, and anchorage good; it is in all parts accessible to large vessels to the distance of 7 miles from the shore, which generally may be considered sufficiently near to distinguish the land, and often to recognise the mouths of the rivers. In thick weather the water should not be shoaled under 7 fathoms.

COAST.—Sallatuk point bears S. $\frac{1}{2}$ E., distant 14 miles from Matakong island, the general features of the coast between are similar to those already described, but the inland mountains are too distant to be distinctly seen; here and there a cotton tree, with smooth trunk and spreading foliage, rises above the surrounding thickets, and serves to identify the locality to those who are acquainted with it; but a stranger can only distinguish the mouths of the rivers which he intends to enter by the latitude, or by running along the coast from some known point.

FORIKARIA RIVER.—From Matakong island the coast trends to the eastward for $3\frac{1}{2}$ miles, where it turns abruptly to the northward, and forms the west entrance point of the river Forikaria; the space between being fronted with sand and mud-banks, which extend nearly 4 miles to the southward.

Least depth.—The entrance of this river is about 2 miles wide, and the least depth in it is 6 feet.

Directions.—In entering, it will be necessary to pass close to the banks which extend from the west entrance point, but at the same time to be cautious in approaching them, as they are “steep-to,” and dry at low water. The outer sand will be apparent, even in fine weather, except perhaps at high water, and when seen may be safely skirted in a depth of 2 fathoms near low water, or in 4 fathoms at high water.

In order not to get entangled in the bight between the forks of this sand, do not bring the highest part of Matakong island to bear northward of N. by E. until the west entrance point of the river bears N.E. $\frac{1}{2}$ E.

Then steer towards West point, and, as a general rule, keep near the western side of the river, though edging off occasionally to avoid the banks.

The navigable part of the river is very short, as a ridge of rocks nearly crosses it at a mile from its mouth. The ebb stream here is extremely rapid, and the overfalls in the vicinity of the rocks are dangerous to those who do not possess local knowledge.

Tides.—It is high water, full and change, in Manea, Morebaia, and Forikaria rivers at 7h. 40m.; springs rise 11 feet.

MELLAKORI RIVER.—This river falls into the sea immediately northward of the high land of Sallatuk point, distant 33 miles N. by E. $\frac{1}{4}$ E. from cape Sierra Leone. It has better natural objects for leading marks than either of those rivers already described; but though the facilities for its navigation are greater, yet a pilot is indispensably requisite.

Three important streams fall into Mellakori river; on the northern side Tanna river, immediately east of Tanna island, affords communication with the Forikaria, and on the southern side Sambo river, entered 3 miles south-east of Benti point, communicates with Skarcies river; Morikaria river, the entrance to which is on the south side, about 2 miles east of that the Sambo, has not yet been explored.

Above the confluence of the Morikaria river the bed of the river is rocky, and there are many shoal spots not marked upon the chart.

Tanna island, on the northern side of the entrance of Mellakori river, lies between it and the entrance to the Forikaria; the west and south-west sides of this island are fronted by extensive sand and mud-flats, which dry in several places at low water.

Sallatuk point, the southern entrance point of the river, is higher than any part of the adjacent coast; it is covered with mangrove bushes, which give it the appearance of terminating abruptly; a reef of rocks, both above and below water, extend $1\frac{1}{4}$ miles north-west and north of Sallatuk point.

Supplies.—A few sheep may be procured at Malaguia; water is scarce.

Pilots.—Good pilots for Mellakori river may be obtained at Sierra Lecue for either a steam or sailing vessel.

Shoal.—There is a shoal, with 15 feet water over it, in the approach to the South channel to Mellakori river; it is said to be 3 cables long N.E. and S.W., and one cable wide, with the centre of Matakong island bearing N. $\frac{3}{4}$ E.; Sallatuk point S.E. $\frac{1}{4}$ E., and the remarkable tree upon Bellansang point E. $\frac{3}{4}$ S.

Benti point, well marked by a tall cotton tree, with a bare trunk, situated near the extremity, has since 1866 been occupied by the French as a fortified post; the station is situated on a plateau above Benti point, and here there are several factories and the Customs house. There is a conspicuous clump of trees on Bellansang point.

Middle ground, a bank of hard sand that divides the entrance into the North and South channels, is "steep-to;" its eastern extremity dries at low water, also some places on its northern side, but the edge of the bank is generally marked by strong rippings; the pilots recommend skirting it, instead of borrowing on the shore.

The north channel is only available for small vessels, the south channel is that generally used, and vessels drawing 16 feet water can enter by it.

Buoy.—A red buoy is moored in a depth of $2\frac{1}{2}$ fathoms at the entrance of the river with Sallatuk point bearing S. by E. $\frac{7}{8}$ E., distant 3 miles; and Tanna point E. by N. $\frac{1}{2}$ N. See Caution; buoyage, page 33.

Beacons.—The outer edge of the shoals on either side of the river between Tanna river and Benti point is marked by a red beacon surmounted by a cone pointing downwards; at low water these beacons are dry, and at high water the cones are awash.

CAUTION.—The buoy and beacons are not to be depended on.

Rock.—A rock, with $7\frac{3}{4}$ feet water over it, lies N.W. by N. from the south beacon, distant $1\frac{1}{2}$ cables.

Least water.—In 1894 the least depth obtained at low water was 13 feet, and a vessel, of 15 feet draught, may enter at three-quarter flood, when the least water found will be 19 or 20 feet, over hard sand.

Anchorage may be taken up to the southward of the entrance to the Tanna river.

Directions.—South Channel.—In 1894 the South channel, which is subject to change, was found to lie more towards the southern side of the entrance, the water having deepened towards the southern bank, and the shoals on the northern side extended to the south.

At 10 miles off shore when west of the entrance there are 6 fathoms water, and with the river's mouth bearing E. by N. it will be fairly open. Steer for Sallatuk point on a E. by S. $\frac{3}{4}$ S. bearing, until the tree on Bellansang point bears E. $\frac{5}{8}$ S., when it should be steered for, and the outer buoy seen, and when the tree at Benti point bears E. by N. $\frac{3}{8}$ N. course should be altered for it until Bellansang point bears E. by S. $\frac{5}{8}$ S.,

when East point at the entrance of Tanna river should be steered for, after which the chart can be the only guide.*

North Channel.—Entering the north channel, which is only available for small vessels, when 5 or 6 miles off shore, bring Tanna point to bear E. $\frac{3}{4}$ S., and by carefully using the lead, a handy vessel may proceed in with safety; for although at its termination the channel takes a slight turn round the north-east edge of Middle ground, yet this is generally so well indicated that one can scarcely be deceived. The extension of the north bank, already mentioned, will have probably contracted this channel.

To proceed above Tanna river.—The deep-water channel between the banks extending from the north and south shores is a third of a mile in breadth, with depths of from 7 to 9 fathoms.

By keeping the east point of Tanna river bearing N.W. by W. $\frac{1}{4}$ W., this channel may be used with safety; the northern beacon, in line with the northern cotton wood tree on Benti point, bearing about East, leads north of the southern bank, and by keeping the same beacon in line with the trading post at Benti, a vessel may proceed until within 2 cables of the beacon, which should be rounded at the distance of half a cable.

After passing this beacon the south bank of the river may be followed as it is safe of approach, and, there being no further danger, except a few rocks close to Benti point, a vessel may ascend the river to the factories established abreast of Devil island, $2\frac{1}{2}$ miles east of Benti point, the general depth in the channel varying from 5 to 9 fathoms. In front of the wharf at Benti there is an eddy on the flood tide which has to be guarded against.

Vessels, drawing about $9\frac{1}{2}$ feet water, trade as far up as Malaguia, but those of 10 feet draught are advised to anchor off Tumani, $6\frac{1}{2}$ miles above Benti point; when approaching Malaguia the southern shore must be kept aboard to avoid a rock awash lying a short distance off the bank in front of the village.

Tanna river.—This river, which falls into the Mellakori on the northern side, winds through the middle of a large plain, its banks being generally clean, and covered with mangroves. Small steam vessels, drawing about 8 feet water, can ascend the river so far as the village of Yankisa, situated 14 miles from the entrance; the tidal streams are not so strong as in the main river.

A bank, which dries at low water, extends for nearly 6 cables in a westerly direction from the east point of the entrance to Tanna river, and

See chart No. 614.

* Captain Terquerrs, French vessel of war, *Brandon*, 1894.

a shoal, on which the depth is 6 feet, lies about 2 cables south of the extreme of this bank.

Opposite the south point of this bank, and at about 160 yards from the right bank of the river, is an isolated rock which dries about 6 feet at low-water, spring tides.

At 5 miles from the entrance of the Tanna rivers, on the west side, is situated a creek, that admits of boat communication with Forikaria river, and at about 8 miles on the same side, the Sankine river affords the only known available passage, into the Forikaria river, above the bar which closes its entry from seaward.

The Forikaria above this bar may be entered by the Mellakori, Tanna and Sankine rivers by vessels drawing not more than 7 feet water, entering the latter river at the last two hours of flood tide, the Sankine having three bars, on which at half tide there is not more than $9\frac{1}{2}$ feet water.

CAUTION.—On account of the soft nature of the bottom, vessels may ground in several places in the vicinity of Mellakori river without being injured; but the foul ground which surrounds the long reef off Sallatuk point must be carefully avoided.

Tides.—It is high water, full and change, in Mellakori river, at 7h. 40m.; springs rise 11 feet.

COAST.—From Sallatuk point the coast, low and wooded, trends in a south-south-east direction for a distance of 7 miles to a small river, on the western point of which is situated Sangatuk factory; at about $1\frac{1}{2}$ miles westward of this point lies Yellaboi island, surrounded by mud-banks that are dry at low water, and which then connect it with the mainland. Another small river named Inglis Pahboyea is situated $1\frac{1}{2}$ miles south of Sangatuk factory.*

Yellaboi island is low, swampy, nearly 2 miles in length, and covered with trees, which towards its western extremity give it the appearance of an abrupt cliff, at times easy to be recognised, at other times difficult to distinguish against the mainland.

Yellaboi anchorage.—To make this anchorage, bring the west extreme of Yellaboi island to bear E. by N. $\frac{3}{4}$ N., and steer towards it until the depth decreases suddenly to 5 fathoms, when alter course, and keeping in 4 or 5 fathoms, steer for Inglis Pahboyea river, well open of the south-east extreme of Yellaboi island, bearing E. $\frac{1}{2}$ N., until the west extreme of that island bears N. by E. $\frac{3}{4}$ E.

From this, keeping in towards the island, and skirting along the steep mud-bank which borders its south side, steer for its south-east extremity, close to which a vessel may anchor in $4\frac{1}{2}$ fathoms water. By following these directions, the least depth found will be 2 fathoms at low water;

See chart No. 614.

* See chart No. 601.

and this only occurs after hauling in for the island, and while running along the edge of the mud-bank on its southern side.

Between May and the middle of September westerly winds raise a heavy sea at this anchorage, rendering it dangerous.

Kortimo island lies $3\frac{1}{2}$ miles S.S.E. from Yellaboi island; it is a much larger island, with extensive mud-banks extending to the north-westward, but with a deep channel between it and the mainland; it lies in the entrance of the Great and Little Skarcies rivers; the Little Skarcies is adapted to very small vessels only.

Tides.—It is high water, full and change, in Yellaboi sound at 7h. 10m.; springs rise 10 feet.

GREAT SKARCIES RIVER is navigable for vessels drawing about 15 feet water, but no vessels, except those of light draught, should attempt it without a pilot, as the navigation, over the banks at the entrance, is stated to be intricate until past Kakonka island. Kakonka island, lying on the north side of the entrance of the river, is a port of entry under the Sierra Leone Customs. No supplies can be had here, but fish are easily caught. The French have a factory at Mambolo about 10 miles above Kakonka island.

The direct channel from seaward to Great Skarcies river leads across 7 miles of shoal water, and shifting banks; and, therefore, vessels would do well to adopt the entrance through Yellaboi sound; for although the banks in this sound are steep, yet it is broad and deep, and a large vessel, by taking a proper time of the tide, might cross the bank which obstructs the eastern part of the sound, and moor off the south extreme of Yellaboi island.

In 1890 H.M.S. *Alecto* proceeded up the Great Skarcies river so far as Robat, about 25 miles above Kakonka island, which latter was left on the port hand on entering. When anchored off Kichom ample swinging room was found, but above that place the breadth of the river varied, being in some places very narrow; the turns, sometimes sharp, and the strong stream necessitated care in steering; the mangroves were generally close to the river edge.

At Robat there was no room to swing and the vessel was moored head and stern, the depth being $5\frac{1}{2}$ fathoms at low water; above that place the bed of the river, becoming rocky, is only navigable by boats.

Directions.—A stranger going up the Skarcies river should engage a pilot at Sierra Leone. The chief difficulty is the passage on the south side of Yellaboi island, where there is a bar which is continually shifting, and also a bank off the entrance of Inglis Pahboyey river where several ships have grounded.

A timber vessel lying at Yellaboi anchorage could easily have the cargo rafted down from Skarcies rivers, except during the rainy season, when it is affirmed that the strong winds occasion so heavy a sea as to make it unsafe to lie there with raft ports open. With little difficulty, however, at that season, a vessel might proceed to Kakonka island, though the channel is narrow and crooked, and would perhaps require buoying.

It would be scarcely possible to give intelligible marks for this winding channel. By sending a boat ahead and never shoaling the water to less than 3 fathoms, except when crossing the short flats which lie north and south of Yellagumba island, a vessel can scarcely make any mistake; the bottom is so soft, and the water so smooth, that no damage will arise from touching, except on the banks which are all hard sand, and care is therefore necessary in steam-vessels, as the pipes in the condensers get choked by the sand and mud caking.

In June, 1876, the bar south of Yellaboi island (on which was a depth of about 9 feet at low water) was found to lie to the westward of its assigned position, and there was a depth of $3\frac{1}{2}$ fathoms on the flat extending from the south coast of that island. Between Sangatuk factory and Inglis Puhboyea river, a mud-bank, dry at low water, extends a considerable distance to the southward. The southern edge of this bank may be avoided by keeping Yellagumba island a third shut in by the north-east extreme of Kortimo island, bearing about S.E. $\frac{1}{4}$ E.

After passing this bank keep on the northern shore of the channel for about a mile, and then steer across to the north-east extreme of Kortimo island, after skirting which steer for the south extremity of Yellagumba island, which must be rounded as close as possible. From this position steer direct for Kakonka factory.* After passing Kakonka island, keep very close to the northern shore of the channel, where there is a narrow 10-foot channel.

Little Skarcies river, entered south of Kortimo island, is obstructed by a large bank of mud on which there are several wooded islets; the channel has little more than a foot water in it, through which small coasting vessels reach the factory situated on its north bank.

Tides.—It is high water, full and change, in Great Skarcies river at 7 h. 10 m.; springs rise 10 feet.

COAST.—From the point forming the south side of the entrance to the Skarcies rivers the coast trends south-west to Ballo point, and thence to the mouth of Sierra Leone river, from which it is distant 18 miles, it takes a more southerly direction. This coast is fronted by an extensive

See chart No. 601.

* Lieutenant A. W. Warry, H.M.S. *Mallard*, 1876.

shoal, the depth of one fathom being found in some places at a distance of 4 miles from the land; and with Ballo point bearing East, a vessel will not be sure of carrying 7 fathoms, at a less distance off shore than 14 miles.

Cooper rock, which generally breaks, is situated on the southern part of this bank. From it cape Sierra Leone bears S.W. by S., distant 6 miles; this rock lies $2\frac{3}{4}$ miles from the nearest shore.

Depths off shore.—Between Isles do Los and Sierra Leone, although shoals extend some distance from the land, no danger need be apprehended if the soundings are strictly watched, and a 7-fathoms line maintained; shoaler water than charted was reported in 1884 to the westward of Cooper rock.

SIERRA LEONE, in respect of the number of its European residents, is the most considerable of the British possessions on the west coast of Africa. The colony consists of the peninsula, which is formed of ranges of bold, forest clad, granitic mountains that terminate in cape Sierra Leone, with a large tract of country named Sherbro. For general information on the settlement, *see* Chapter I., page 10.*

Sierra Leone river.—The entrance to Sierra Leone river, immediately northward of cape Sierra Leone, is obstructed by an extensive bank of sand interspersed with large stones, named the Middle ground which in many parts is dry at low water, and is reported to be extending to the south-west. There is a passage on either side of it, but that to the northward is only available for small vessels, and even by them is rarely attempted, as they must cross a 2-fathoms bar, which appears to connect the eastern extremity of Middle ground with the mainland.

The principal channel lies between cape Sierra Leone and Middle ground, and has a clear passage of more than a mile in breadth everywhere, with depths varying from 5 to 12 fathoms. Between cape Sierra Leone and Freetown the shore is indented by three bays, the western of which is known as Pirate bay, and the eastern Kru bay, between these is situated English bay.

The river is navigable for boats as far as Rokel, between which place and Rokon there are rapids, and navigation is dangerous. Steam-vessels do not ascend beyond Benkia about 15 miles above Freetown.

Port Lokko creek entered on the north bank opposite Benkia, and which extends 15 miles to Port Lokko, is easily navigable for steam launches at any time later than one hour after low water.†

* *See* Admiralty plan : Sierra Leone river, No. 616; scale, $m = 1.0$ inch.

† H.M.S. *Alecto*, 1898, proceeded up port Lokko creek in charge of a native pilot, and found the chart a sufficient guide until just above Bance island; here there were two large mud and sand flats, nearly dry in places, but the least water obtained was 12 feet. *See* chart No. 601.

LIGHTS.—On the northern extremity of cape Sierra Leone a lighthouse, 69 feet in height and painted white with a red lantern, exhibits two lights placed vertically, the upper, at an elevation of 75 feet above high water being a *fixed and flashing white* light, with a period of system of *half a minute*, which should be visible, in clear weather, from a distance of 14 miles; the lower, a *fixed red* light, is elevated 52 feet above high water, and should be visible 13 miles, through an arc of 22° , between E. $\frac{5}{8}$ N. and E. by S. $\frac{1}{3}$ S.

From the lighthouse, the west end of Carpenter rock bears W. $\frac{1}{2}$ N. distant 9 cables, and the western edge of the Middle ground bears N.E. $\frac{1}{2}$ N., distant $1\frac{3}{4}$ miles.*

Carpenter rock lies W. $\frac{1}{2}$ N., distant 7 cables, from cape Sierra Leone, uncovers at half tide, and may easily be distinguished by its breakers; it should be borne in mind that both flood and ebb streams set directly on this rock.

Clearing marks.—Any point from Farran point to Lookout point, kept open to the northward of cape Sierra Leone, on a general S.E. by E. $\frac{3}{4}$ E. bearing, leads north of Carpenter rock: this mark is also useful in observing the direction of the tidal streams. The ebb stream sets to the south-eastward, and the flood to the northward.

Bromham rock, about 30 yards in circumference, nearly flat, and with a depth of 15 feet on it at low water, spring tides, lies between Carpenter rock and the shore, and appears to be the termination of a series of shoals that extend in a W. by S. direction from the extreme west point of the cape. There are depths of 4 and 5 fathoms between it and the shore, and 5 and 6 fathoms close to and around it.

From the rock Sierra Leone lighthouse bears N.E. by E. $\frac{1}{2}$ E.; Carpenter rock N.W. by W. $\frac{1}{2}$ W.; and the extreme west point of the cape E. $\frac{2}{3}$ N., distant $1\frac{1}{4}$ cables. The lighthouse bearing E. by N. $\frac{1}{2}$ N. leads north of the rock; and the north extreme of the sandy beach, where it first joins the rocks south of cape Sierra Leone, bearing E. $\frac{1}{2}$ N. will lead southward of it.

The channel between Carpenter and Bromham rocks, although clear, is not recommended except in cases of emergency; even in the dry season the tide rip in this channel is dangerous for boats.

A rocky ridge, about 3 cables in length, in an east and west direction, and having 3 fathoms least water over it, is situated with cape Sierra Leone lighthouse bearing N.E. $\frac{1}{8}$ E., distant one mile from its centre, and Lookout E. by S. $\frac{2}{3}$ S.; there is usually a strong ripple over this shoal.

See chart 616.

* The interval of *flash* is reported to be irregular, 1890.

Pirate bay.—The western entrance point of Pirate bay is surmounted by a peak, which rises higher than cape Sierra Leone, and on a hill, about a mile south of the east entrance point (Lookout point), there is a lookout station; the shore of the bay is of reddish and dark rocks.

King Toms point, which forms the dividing point between English and Kru bays, is the northern extremity of a flat, almost circular peninsula, which on some parts is thickly wooded; there is a battery and some ruins at its north extreme, and a large mission establishment on its eastern side.*

Freetown, the capital of Sierra Leone and the seat of Government, was founded in 1792, and is built on rising ground sloping from the hill on which stands Government house, which, being surrounded by trees, is not easily recognised from seaward; south of this hill, on an elevated plateau, 400 feet above high water, are situated the hospital and barracks. The streets are wide but unpaved, the houses mostly constructed in European style, and it is the residence of the principal civil and military authorities. The population in 1895 was over 30,000.

LIGHT.—A small *fixed green* harbour light is shown from the government wharf, as a guide to the anchorage.

Communication.—Steamers belonging to the African Steamship Company and British and African Steam Navigation Company call weekly at Sierra Leone; there is also communication by steamers with Manchester and Hamburg, and by sailing vessels with New York; telegraphic communication with Bathurst, Konakri, Accra, and England. There is a railway between Freetown and Songo town which is to be extended to Rotifunk, 25 miles from Songo town.†

Coal and Supplies.—From 5,000 to 7,000 tons of coal is generally in store, and about 300 tons can be taken on board in a day, or 400 working day and night. Coal is brought alongside in lighters as there is no wharf, and put into the bunkers by the contractor, but the lighters cannot remain loaded during the night in the tornado season; there are 19 lighters carrying 420 tons. A strong North or N.W. wind during the months of May to October may retard coaling and render landing at the usual steps impossible, but under these circumstances landing may be effected above the custom house.

Provisions and water can be obtained from the depôt at Freetown; a small pipe is led to the landing stage, but it is cheaper to hire a lighter to procure water.

Jetty.—There is a Government jetty at which goods are landed, and a crane which will lift 5 tons and 5 cranes lifting 3 tons, but there are no facilities for repairing vessels.

* See plan of anchorage and town of Sierra Leone on Admiralty chart No. 616.

† Opened for traffic so far as Waterloo, 1899.

Pilots.—Vessels intending to proceed up the river beyond Freetown must take a pilot from that place; for although there is no danger by steering E.S.E. for 5 miles from the anchorage, yet, beyond that distance the navigation becomes intricate. The pilot boat carries a blue and white horizontal flag.

Telegraph buoy.—A buoy painted black, with *Cable* in white letters on it, is moored in $11\frac{1}{2}$ fathoms water one cable east of King Toms point to mark the telegraph cable.

Trade.—The principal exports are palm oil and kernels, beni seed, hides, kola nuts, indiarubber, gum, &c., valued in 1897 at 400,748*l.*, and imports cotton goods and haberdashery, spirits, hardware, flour, lumber, and medicines, &c. at 457,889*l.* The number of steam vessels entered at ports of the colony was 373, with an aggregate tonnage of 534,401 and 313 sailing vessels, aggregating 7,720 tons.

Anchorage.—To anchor a large vessel off Freetown, bring the battery, south-west of the barracks, to bear about S. by W., and King Toms point W. by N., which position will be 2 cables from the shore, in 17 fathoms water, over muddy bottom, and where a vessel may moor with open hawse to the northward. Small vessels generally anchor within the line of Farran and Lookout points, where very little tidal stream is experienced.

H.M.S. *Blake*, 1898, moored in 11 fathoms water, over sand and mud, with Farran point bearing S.E. by E. $\frac{1}{4}$ E.; Falconbridge point S.E. by S., and the right extreme of the barracks S. $\frac{1}{4}$ E., and found it a good anchorage for a vessel of deep draught, as, although several tornadoes were experienced during the vessel's stay, the anchors held. During the tornado season it is advisable to moor with a good scope of cable.*

Directions.—Vessels approaching from seaward will probably endeavour to strike soundings in lat. $8^{\circ} 30' N.$ When in a depth of 9 or 10 fathoms they will be 12 or 13 miles from the shore; or if the weather be clear, they will have seen the high land named Lion mountains, situated south of the cape, which should be brought to bear about E.S.E.; when about 10 or 15 miles distant from the shore, cape Sierra Leone will be seen, making like a low point, with a ridge of cocoa-nut trees close to the water's edge, and shortly after the lighthouse on it will be distinguished. Orontes bank, see page 340.

See charts Nos. 601, 616.

* It is worthy of note that at Sierra Leone squalls from the eastward invariably occur on the ebb tide, that is, they originate on the ebb and very occasionally, they may return, blowing from the north-west on the succeeding flood.—Navigating-Lieutenant C. B. Clark, H.M.S. *Boxer*, 1879. During the stay of H.M.S. *Blake*, from 12th May to 6th June 1898, tornadoes always occurred at night and immediately after the tide had turned. Remark Book, Navigating Officer, H.M.S. *Blake*, 1898.

In the winter the land is often covered in mist, preventing the form of the hills being distinguished, when greater care is necessary by sounding frequently.

Allowance for the tide must be made when nearing Carpenter rock, and the cape may be passed at distances of from a quarter to half a mile, with a commanding breeze, in 9 or 10 fathoms water. From thence *n* S.E. by E. $\frac{1}{4}$ E. course for $3\frac{1}{2}$ miles will lead to the anchorage off Freetown; it is recommended to keep somewhat near the shore, where the tidal streams are weaker, thus avoiding the Middle ground and the numerous eddies round it, which are so strong as to effect the steerage.

A vessel of 24 feet draught should not bring cape Sierra Leone light-house to bear southward of S. by E. $\frac{1}{2}$ E. until Farran point bears S.E. by E. $\frac{1}{4}$ E. in order to clear the 4 fathoms extension of the Middle ground; King Toms point in line with the centre barrack, bearing S.S.E. $\frac{7}{8}$ E., also clears this shoal. Farran point forms a good mark for entering; it is covered with dark trees and has two dome-shaped mango trees and a large galvanised iron storehouse near its extreme; the mango trees and the roof of the storehouse are conspicuous.

By night.—When approaching Sierra Leone by night, from the northward, the light should not be brought to bear west of S.S.W., to avoid the Middle ground; but vessels drawing 24 feet water should not bring Sierra Leone light to bear southward of S. by E. $\frac{1}{2}$ E. until past the 4 fathoms shoal extending westward of the shoal part of the Middle ground; and if from the southward and westward, keep the light bearing southward of E. by S. $\frac{3}{4}$ S. to avoid Carpenter rock.

After passing the cape, the *green* light at the extremity of the government wharf will guide to the anchorage; but should the light on the cape not be seen, vessels are advised to anchor, in order to make sure of their position, as the tide and current sometimes combine in sweeping them out of sight of the land before morning, or even into the dangerous vicinity of St. Ann shoals.

Turning marks.—When working in or out of Sierra Leone river in a sailing vessel (which must never be attempted unless with a favourable tide), stand no nearer the Middle ground than 7 fathoms, nor with an ebb tide to within three-quarters of a mile of Carpenter rock. King Toms point, in line with the centre Barrack, bearing S.S.E. $\frac{7}{8}$ E. leads close to the 3-fathoms edge of the west extreme of the Middle ground, which is reported to be extending.

Leaving Sierra Leone.—When proceeding to the northward, the light on the cape, bearing S.S.W., leads west of the Middle ground in 4 fathoms water, but before altering course for the northward, the light

should be brought to bear S. by E., or more easterly if the flood stream should be making.

Tides.—It is high water, full and change, in Sierra Leone river at 7 h. 50 m.; springs rise $12\frac{1}{2}$ feet.

Tidal streams.—In the rainy season the ebb stream runs with great strength, sometimes at the rate of 6 knots an hour; but in the dry season the velocity of neither of the tidal streams exceed $2\frac{1}{2}$ knots an hour.

CAPE FALSE.—Southward from cape Sierra Leone for a distance of 4 miles, the coast forms a slightly indented bay, bordered with trees, and terminating in a double rocky point named cape False, which bears S. by W. $\frac{1}{2}$ W. from cape Sierra Leone, and from thence to cape Shilling the coast trends S. $\frac{1}{2}$ E. for a distance of 17 miles.*

Cape Shilling, 225 feet above high water and covered with bushes, appears, from a distance of 10 or 15 miles, like a small island. At this cape the mountains of Sierra Leone terminate, after forming a high double range, which is visible from a great distance. The southern portion of the range is the most elevated, and though the summits are generally enveloped in clouds, it is often seen from a distance of 40 or 45 miles. Kent town, the residence of the Commissioner of the district, is a village of liberated Africans, standing on the side of a hill near the cape; bush fowl and small antelope are fairly plentiful.

Communication.—There is mail communication by road with Freetown, twice weekly, by native carriers.

Landing.—The landing place is situated on the north side of the cape, on a small sandy beach between rocky ledges; it is not visible until quite close to; a small light is occasionally shown from it, but a stranger should not attempt landing at night.

Shilling islet or Thistle rock, including the trees on it, is 27 feet above high water, and separated from cape Shilling by a channel 5 cables wide.

York village is situated at the entrance of Whale river (formerly known as York river) at $6\frac{1}{2}$ miles north of cape Shilling.

Landing.—There is good landing on the sandy beach southward of York village, where boats can lie at any time of tide.

Reef.—A dangerous reef, which dries at low water, lies 11 cables off shore and 2 miles N.W. by N. from the islet off York village.

* See chart No. 601.

Maroon islet, wooded, and 100 feet in height, lies 2 miles N. by E. $\frac{1}{2}$ E. from cape Shilling. A small rock, which generally breaks, is situated $1\frac{8}{10}$ miles, N. by E., from Maroon islet.

The coast between False cape and cape Shilling has not been closely examined, but from a position 2 miles abreast of the former a course may be shaped for the east end of Banana islands, and a depth of not less than 6 fathoms carried, until the edge of the 4-fathoms bank is struck, which extends 5 miles in a northerly direction from Dublin, the eastern island.

BANANA ISLANDS, lying 2 miles south-west of cape Shilling, very much resemble the Isles do Los, but the adjacent land is more elevated. They are extremely fertile, with plenty of water, though there are no running streams; considering their proximity to the African continent, they are comparatively healthy, so much so, that the European residents of Sierra Leone frequently resort there to benefit their health. The islands are three in number, lying in a N.E. by E. and S.W. by W. direction.

Dublin, the largest and easternmost, is 567 feet above high water, and has about 450 inhabitants. The middle island, named Ricketts, has a population of about 350; it is volcanic, 827 feet above high water, covered with wood; and is connected with Dublin by a narrow causeway, constructed by the natives, and separated from Meheux, the western island, by a passage 170 yards broad, navigable for boats.

Meheux island is 210 feet above high water; a copious and permanent spring of fresh water is said to exist at its south-east extremity.

Supplies.—Pigs, goats, inferior fowls, fish, eggs, yams, bananas, &c., can be obtained, and there is a well of good water in the village.

Dangers.—A rock of small extent, which generally breaks, lies due west from the western extremity of Meheux island, distant 4 cables. Several detached rocks also exist on the north side of Banana islands, but all within a distance of quarter of a mile from the shore.

Anchorage.—The usual anchorage is in 6 fathoms water, off the north side of Dublin, with the church bearing S.S.E., and distant about 5 cables from the shore.

The landing place is opposite a large cotton tree in the centre of the sandy beach, on the north-east end of the island, from which a path leads to the village of Dublin.

A large clump of cotton trees and the church are conspicuous on the east end of Dublin, approaching from the northward.

Observation spot.—The north-east point of Dublin island is in lat. $8^{\circ} 8' 16''$ N., long. $13^{\circ} 11' 25''$ W.

Tides.—It is high water, full and change, at Banana islands at 7h. 18m.; springs rise 10 feet.

Tidal streams.—The flood sets East and E.S.E.; the ebb W.S.W. and W. by N.; rate 1 to $1\frac{1}{2}$ knots.

Channel east of Banana islands.—Though $1\frac{1}{2}$ miles broad between the islands and Shilling islet, this channel is obstructed by Wolf rock lying in the fairway; shoal ground also extends from the east side of Dublin for a distance of 4 cables. In the year 1899 the remains of an iron steamer were 2 cables inside the edge of this foul ground, the top of the vessel's boiler being awash at high water, spring tides, resembled a can buoy.

Wolf rock, nearly awash at low water, lies 11 cables S.W. $\frac{3}{4}$ W. from the summit of Shilling islet; shoal patches also exist east and west of Wolf rock within a distance of quarter of a mile.

A shoal, with a depth of 16 feet over it, lies 6 cables W.S.W. of Shilling islet, nearly in the fairway of the eastern channel. Vessels with local knowledge pass on either side of Wolf rock, but as long as the wreck remains visible on the foul ground off Dublin, the western channel appears preferable; vessels should pass 3 cables off the wreck.

It is impossible to give any leading marks in these narrow and dangerous channels for clearing Wolf rock, which generally breaks with a moderate wind. There are numerous tide rips in the channel, and the tidal streams set strongly through. Large vessels and strangers are strongly recommended to pass westward of Banana islands.

Anchorage.—Vessels may anchor off any part of the coast between cape Sierra Leone and the Banana islands. During the tornado season, from a berth on the north-west side of the group, with the extremes bearing S.S.E. and S.W. by W., if a vessel parted, she would drift clear of danger.

Yawri bay.—Shaingai point lies 19 miles S. by E. $\frac{3}{4}$ E. from cape Shilling, and west from it extends the Plaintain islands and Bengal rocks forming the northern side of the entrance to Sherbro river. The space included between Banana and Plaintain islands is named Yawri bay, into which the Oribi, Kamaranka, Bumpe, and Cockboro rivers discharge their waters. The shores of this bay are fronted by a reef extending 4 miles from the coast, many parts of which are dry at low water.

Oribi river is navigable for boats as far as Mafengbe, about 22 miles from the entrance, and for steam-launches drawing 4 feet of water to within 200 yards of that place. The principal trading vessels are small schooners, which can cross the bar at almost any time of tide, but the

entrance is much obstructed by sand-banks, some of which uncover at low water.

With the aid of a pilot from Sierra Leone the steam-cutter of H.M.S. *Rifleman*, drawing 3 feet, was able to pass in and out at all states of the tide. Inside the bar the river widens and is deep; just above where the steam-vessels anchor there are some rocks nearly in mid-channel.

Bumpe river forms the best route to the Mendi country, and small steam-vessels can go up to the fork of the Rotifunk and Senahu rivers.

Shaingai (Tasso) Point consists of soft red sandstone 20 feet high, and is rapidly being encroached on by the sea. The headquarters of the American Ottervein Mission is established here, the church and school house of which are conspicuous. There are several native villages situated southward of the point, the land between which and Yinkin point, 3 miles to the southward, is well cultivated.*

Pier.—There is a stone pier belonging to the mission on the north side of the point, but landing is only practicable at high water.

Depths of shore.—As the bottom in the vicinity of Shaingai point is very uneven, and the 5-fathoms line extends for a distance of 9 miles west of the point, vessels will do well not to approach it within that distance, until it is brought to bear northward of East.

Plaintain islands, low and wooded, are nearly connected with Shaingai point by a chain of rocks, above and below water. Gilmorris, the western island, is rounded, 80 feet above high water, and conspicuous.

Begnal rocks consist of two groups, the north-western, which is of a black colour and dries 3 feet, is situated W. by N., distant $4\frac{1}{2}$ miles from Shaingai point, and a bank, with only 9 feet water in places, extends for a further distance of $1\frac{1}{2}$ miles outside them.

SHERBRO RIVER.—Sherbro river is bounded on the north side by the mainland, and on the south by Sherbro island and the numerous islets situated on the Turtle or Sherbro bank, extending in a north-westerly direction from it. Though locally known as Sherbro river, it is more correctly described as a sound or strait.

The width of entrance to this river is 21 miles, from Shaingai point on the north, to cape St. Ann on the south, decreasing rapidly on advancing eastward, and the navigable portion for a large vessel is barely 3 miles wide, owing to the shoals off Shaingai point, already referred to, and the extensive bank on the south side, with the shoal ground extending northward from it.

* See Admiralty Chart :—Sherbro river, No. 617 ; scale, $m = 1\cdot0$ inch.

Four rivers fall into the Sherbro river from the north and east—the Yaltukka, at 27 miles S.E. from Shaingai point; Bagru river, 16 miles further east; the Jong, 11 miles more to the south-east; and Bum-Kittam river, 8 miles beyond to the southward. This last has its outlet close north of Manna point, the eastern limit of Shebar entrance.

The shore between Shaingai point and Buoy point, on the north side of Sherbro river, is low and sandy, fronted by extensive shoal flats and sand banks, extending in some places 5 miles from the coast; between Yaltukka river and Buoy point the shore is thickly wooded.

Bonthe, the principal settlement, in the Sherbro river, has a somewhat imposing appearance, several of the houses being large and well built, the most conspicuous being the court house and the residence of the English District Commissioner. In 1891 the native population amounted to 3,577.

LIGHT.—A small *fixed red* light is shown from the end of the pier near the Commissioner's house.

Communication.—There is regular weekly communication with Freetown by a small steamer on arrival of the English mail.

Supplies.—Water, bread, beef, sweet potatoes, bananas, pines, oranges, &c., can be procured, also yams during the dry season.

Hospitals.—There is a hospital containing 12 beds at Bonthe; and at Bonthe-bai, at the northern end of Bonthe, is a hospital for patients suffering from infectious diseases.

Quarantine Regulations.—The quarantine anchorage is about midway between Bomplake point and York island; vessels anchoring there, discharge and receive their cargoes without having any personal contact with the labourers working the lighters alongside.

No person other than the master is allowed on shore, and he lands at the lazaretto at Bonthe-bai in the first instance, for the purpose of being disinfected before transacting the ship's business.

All communication with shore boats is prohibited: and a police constable is placed on board to guard against any infringement of the quarantine regulations.

Trade.—In 1894 the Customs revenue was about 23,000*l*. The value of imports, consisting of general merchandise, spirits, tobacco, hardware, cutlery, gunpowder, guns, salt, and cotton goods, amounted to 109,763*l*.

The value of exports in native produce, shipped by British and foreign steamers and sailing vessels, consisting principally of palm oil, palm kernels, rubber, and camwood, amounted to 124,158*l*.

In 1894 the total number of arrivals and sailings was, steamers 101, sailing vessels 95.

York, on the north-east side of York island, is the calling place for large vessels which lay alongside the piers to discharge and take in their cargoes. The usual native supplies can be obtained; in 1891 the coloured population amounted to 895 and a few Europeans were resident.

Buoy point, lying S.S.E. $\frac{1}{2}$ E., distant 8 miles from the entrance to Yaltukka river, is clearly defined, and though low is visible for some distance; Mandu tree, the largest of three, situated about 4 miles N.N.W. from Buoy point and a quarter of a mile from the coast, is a very conspicuous cotton tree, 205 feet high, which may be seen from a distance of 7 or 8 miles. Pau Kandi cotton tree, 170 feet high, on the Sherbro island shore, south-south-west of Buoy point, is also very conspicuous, and may be seen from about the same distance. From Buoy point the villages of Jenkins and Jamaica on the south shore are visible, the former may be recognised by two large trees, one 165 feet high, the latter by a white church and large factory, both conspicuous.

Between Buoy point and Falcon point, 7 miles E.S.E. of it, the coast consists of mangroves fronted with mud flats extending in places half a mile from the shore.

Titibul creek is situated 2 miles westward of Falcon point, and eastward of Falcon point is the entrance to the Bagru river.

Buoy rock.—A dangerous rock with only 6 feet water over it, and which sometimes shows by rippings, lies 5 cables south of Buoy point. Buoy, *see* page 334.

Sherbro island, about 27 miles long, is low and marshy; its northern coast is fronted by extensive shoals, the western portion of which, known as Turtle and Sherbro bank, is composed of innumerable ridges, knolls, blind channels and pools, but is navigable, in almost every part, by large boats at high water; and by canoes and light boats at low water.

This bank may be said to extend about 12 miles north-west of cape St. Ann, and then joins the shoals of St. Ann, between Cape St. Ann and the north-west extreme of the shoal there are several small islands and banks, the tops of the trees growing on them being from 40 to 150 feet in height.

On the north coast of Sherbro island there are several clumps of trees, and two villages known as Jenkins and Jamaica already mentioned.

Jamaica point, having on it several tall straight trees, is bold and dark looking.

Middle ground.—At Buoy point the main channel of Sherbro river is divided into two, by a shoal of irregular form about $8\frac{1}{2}$ miles long, known as the Middle ground, the northern part of which dries 5 feet at low water; upon this bank there are several other places which also dry at low water.

Bagru channel lying north of Middle ground, is available at all times for vessels, drawing 24 feet water, as far as the Bobs island flat; the bottom is soft mud, and the tides set directly through.

Jenkins channel, which lies south of Middle ground, is only available for small vessels, the eastern part being obstructed by a bar, with a depth of 13 feet, which lies between Jamaica village and the east extreme of Middle ground; the bottom in Jenkins channel is of hard sand.

Bomplake channel.—Between the east extreme of Middle ground and York island, the channel is narrowed by Bobs island, Rendall island, and Long island, all on the eastern side. This portion of the Ship channel is named Bomplake channel. Bobs island flat is an extensive shoal extending about $2\frac{1}{4}$ miles north-westward from Bobs island, it also encroaches considerably on the channel between Bobs island and Jamaica point, forming a bar, a quarter of a mile broad with 15 feet water over it, having passed which, the south side of Bobs island is “steep-to.”

There is deep water between Bobs and Long islands, but the channel to the southward, the turning point of which is three-quarters of a mile westward of Long island, here rapidly shoals and becomes much contracted between extensive shoal flats.

Buoys.—The undermentioned buoys mark the channel in Sherbro river:—

No. 1 (Fairway) buoy, spherical, painted black and white in horizontal stripes, and surmounted by a diamond, is moored in a depth of $6\frac{1}{4}$ fathoms at low-water springs, in the fairway of the entrance to the river, with Banana peak bearing N. $\frac{3}{4}$ W., distant $15\frac{1}{10}$ miles; and Gilmorris island E. $\frac{3}{8}$ S.

No. 2 buoy, spherical, painted black and white in horizontal stripes, and surmounted by a diamond, is moored in a depth of 8 fathoms at low-water springs, in the fairway south-westward of Yaltukka river, with Fry tree bearing N.E. $\frac{3}{4}$ E., distant $6\frac{1}{10}$ miles; and Pau Kandi high tree S.E. $\frac{3}{4}$ S.

No. 3 buoy, spherical, painted black and white in horizontal stripes, and surmounted by a cage, is moored in a depth of $7\frac{3}{4}$ fathoms at low-water springs, in the fairway south-westward of Mandu tree, with Mandu tree bearing E. by N. $\frac{3}{8}$ N., distant $2\frac{8}{10}$ miles; and Pau Kandi tree S.S.E.

See chart No. 617.

No. 4 buoy, can, chequered black and white, is moored in a depth of $7\frac{3}{4}$ fathoms, on the port side of the channel, with Buoy point bearing E. $\frac{1}{2}$ S., distant $1\frac{1}{4}$ miles, and Pau Kandi tree S. $\frac{3}{8}$ W.

No. 5 buoy, can, chequered black and white, is moored in a depth of 7 fathoms at low-water springs, on the south side of Buoy rock southward of Buoy point, with Pau Kandi tree bearing S.S.W., distant $3\frac{1}{4}$ miles; and Falcon point E.S.E.

No. 6 buoy, spherical, painted black and white in horizontal stripes, and surmounted by a cage, is moored in a depth of 4 fathoms at low-water springs, in the fairway south-westward of Falcon point, with Jamaica high tree bearing S. by W., distant $2\frac{1}{4}$ miles; and conspicuous house northward of Rendell island E. by S. $\frac{1}{4}$ S.

No. 7 buoy, spherical, painted black and white in horizontal stripes, and surmounted by a cage, is moored in a depth of $3\frac{1}{4}$ fathoms at low water springs, in the fairway south-westward of Long island, with western point of Long island bearing N.E. by E. $\frac{3}{8}$ E., distant 7 cables; and north-east extreme Bobs island N.W. $\frac{3}{4}$ N.

Directions.—At present the channel north of Sherbro island is considered the only one practicable, the Shebar entrance to the southward not having been recently examined, and from its exposed position to heavy rollers, presenting difficulty and danger.

A stranger, entering Sherbro river, should avail himself of the services of a local pilot if obtainable, in any case the lead should not be neglected as there is reason to believe that no extensive alterations take place in the contour of the outer banks. The least depth in the channel, so far as York, is 15 feet, and so far as Bonthe, 6 feet.

Vessels drawing 18 feet can reach York, those drawing 8 feet can reach Bonthe.

Vessels bound to Sherbro from the northward are recommended to pass outside Banana islands at a distance of 2 miles, thereby ensuring a wide berth to the rock lying westward of Meheux island.

From a position 2 miles W.S.W. of Meheux island a S. by E. $\frac{3}{4}$ E. course for a distance of 16 miles, will take a vessel about three quarters of a mile outside the 5-fathoms line of the shoals extending westward from Shaingai point and about the same distance outside the fairway buoy, No. 1 (spherical, painted black and white in horizontal stripes, and surmounted by a diamond).

As the tides set irregularly across the track, sometimes at the rate of upwards of a knot an hour, every endeavour should be made to ascertain the ship's position, especially when nearing the vicinity of Shaingai point,

bearing in mind that the navigable portion for a large vessel here barely exceeds 3 miles in width.

The outermost of the Plaintain islands, named Gilmorris, rounded and 80 feet high; Yinkin hill, 3 miles south-eastward of Shaingai point; and North island of the Turtle group, together with Banana peak, are usually available for fixing the position.

From a position 2 miles south of Fairway bay, a S.E. $\frac{1}{8}$ S. course for $15\frac{1}{2}$ miles should lead a vessel in not less than 6 fathoms of water, to a position 7 miles W. $\frac{3}{4}$ N. of Mandu tree, and there should be no difficulty in fixing the position by it and some of the numerous islands of the Turtle group. The course is then E. by S. $\frac{3}{4}$ S., $4\frac{1}{2}$ miles, passing about 3 cables northward of No. 2 buoy, (spherical, painted black and white in horizontal stripes and surmounted by a diamond), and about the same distance northward of No. 3 buoy, which is of the same shape and colour as No. 2, but surmounted by a cage.

When abreast of No. 3 buoy, alter course to S.E., for $4\frac{1}{2}$ miles, to pass a cable southward of No. 4 buoy (can, chequered black and white).

Having here carefully determined the position, to ensure passing south of Buoy rock, as the tides set strongly in this part of the channel, a S.E. by E. $\frac{1}{2}$ E. course, for a distance of about 6 miles, leads through Bagru channel, passing at $1\frac{1}{10}$ miles Buoy rock buoy (No. 5, can, chequered black and white). The turning point to the southward is reached when the western extreme of Bobs island, which is 150 feet high and nearly perpendicular on the north side, is just open of the land northward of Bomplake point, bearing S.S.E. $\frac{3}{4}$ E.*

Jamaica point steered for S. by E. $\frac{1}{4}$ E. leads between the eastern extreme of Middle ground and Bobs island flat in not less than 20 feet at low water, passing close to No. 6 buoy, (spherical, painted black and white in horizontal stripes and surmounted by a cage). When leaving the river, the conspicuous cotton trees, situated 2 miles inland, on the mainland steered for N. by W. $\frac{3}{8}$ W. leads through mid-channel.

When about $1\frac{1}{4}$ miles from Jamaica point, or nearly abreast of a small creek, the south point of Bobs island must be steered for on a S.E. by E. bearing,† and a bar a quarter of a mile wide, with only 15 feet water on it at low water, crossed; the south coast of Bobs island may be passed close to, and the course S.E. by E. continued; or the extremity of the land north of Jamaica point kept open southward of Bobs island, bearing N.W. by W., till the vessel is within 6 cables of the west point of Long island.

See chart No. 617.

* See View A on chart No. 617.

† H.M.S. *Thrush*, 1898, found somewhat deeper water a little to the southward of this line; crossing the bar with the south point of Bobs island bearing E. by S. $\frac{3}{4}$ S.

The track now becomes much contracted between the banks and flats on either hand, but a S. by E. $\frac{1}{4}$ E. course for Bomplake point leads through in the deepest water which is 20 feet.*

This part of the channel presents the chief difficulty in the navigation of the river, and the greatest vigilance in the steering is necessary, on no account must the large single tree at Yelbana be shut in by the land about Bomplake point; this tree opening out, which should be looked out for, will give warning of the time to turn to the southward. The positions of the sand-banks to the westward, which dry at low water, are generally indicated by rippings over them at high tide.

When abreast of the creek, situated $1\frac{1}{2}$ miles northward of Bomplake point, a S.S.E. course may be shaped towards the factories on York island until abreast of Bomplake pier, when the north-west point of Hutchinson island steered for S. $\frac{5}{8}$ E., leads clear of the extensive flats to the eastward, and the 18-foot patch on the west side of the track. The north-west end of Hutchinson island may be approached within a quarter of a mile, and a course shaped parallel to the north side of it, which is "steep-to," towards the anchorage, in 24 feet water, off the factories at York island, $1\frac{1}{2}$ cables from the shore.

Small vessels intending to proceed to the anchorage of Bonthe should round Bomplake point closely and steer parallel to the shore on a S.W. $\frac{3}{4}$ W. course, to avoid the extensive sand-bank lying to the eastward, the western edge of which is marked by a few mangroves. The channel midway between Bomplake and Kila shoals to 6 feet.

When abreast of the village of Kila, the course must be altered to the southward, bringing the eastern extreme of the middle island, southward of Bonthe, in line with the south-west extreme of Alldridge island, bearing S. $\frac{3}{4}$ W., with the tall cotton tree at Kila village astern; this course leads between two sand cays lying on either side of the fairway, which are generally marked by rippings at high tide. After passing these, alter course to the eastward, steering S. $\frac{7}{8}$ E. for the north-west point of Alldridge island. This point may be approached close to, and a S.S.W. $\frac{1}{4}$ W. course steered, which will lead to the anchorage, in 15 feet water, with the Commissioner's flagstaff bearing N.W. by W. $\frac{1}{2}$ W. and the north-west point of Alldridge island N.N.E. $\frac{3}{4}$ E.

Vessels, drawing 15 feet water, may proceed from York island to Bendu on the eastern shore of the channel leading to Shebar entrance with little risk, but the channel requires buoying; and great attention must be paid to the steering of a vessel.

From Bendu to Victoria (on the western shore) the channel cannot be used without the assistance of buoys, as it is very narrow, the greatest depth in it being only 14 feet at low water, and the tides running strongly.

See chart No. 617.

* See View B on chart No. 617.

Off Victoria there are depths of 5 and 6 fathoms close to the shore ; good wharves could be easily and cheaply built for loading small vessels.

In navigating Sherbro river, due allowance must be made for the tidal streams, which run with an average velocity of 2 knots an hour.

Bagru river forms a junction with Sherbro river north of Bobs island flat ; it takes a straight course for 6 miles in a north-east direction, when it is joined by Raleigh river, above which junction its course winds for about 10 miles to the native town of Tasso ; Edmonstone island, with a bank extending from its north-east and west sides, is situated at the mouth of Bagru river, 3 miles east of Falcon point, its northern entrance point. The depth of Bagru river, between its mouth and the junction with Raleigh river, varies from 3 to 5 fathoms. It is navigable for steamers so far as Tasso, which is a stockaded town.

Bum-Kittam river is entered immediately north of Manna point, the east entrance point of Shebar entrance ; in the dry season it is only navigable for vessels drawing 4 or 5 feet water ; in the wet season this river rises about 12 feet at the lower part, and as much as 25 feet at the upper part.*

Shebar entrance.—Sherbro river can be entered from the south-ward by a channel at the south-east extreme of Sherbro Island, known as Shebar entrance ; the entrance points, named West Sand head and Manna point, have long sand-spits extending from them, on which the sea breaks at all times of tide ; between these sand-spits is situated the bar.

Least depth.—From Victoria to Shebar entrance, the navigation is simple, but there is only a depth of 13 feet over the flats off Bum-Kittam river ; having passed these, the water quickly deepens to 6, 8, and 10 fathoms.

The dangerous state of the bar at the time of the Admiralty survey in 1870 prevented its being sounded, and it was not examined during the survey of the Sherbro river, 1895, but the local pilots report that there is as much as 18 feet on it at high water. Vessels drawing over 10 feet water, however, are not recommended to cross it even under favourable circumstances ; it is therefore of no use to the mail steamers.

CAUTION.—There is reason to believe that the spits of sand at Shebar entrance are not stationary, and, therefore, a vessel obliged to attempt an entrance should send a boat to mark the extreme of one or both of them.

Anchorage.—H.M. vessels of war occasionally anchor off the entrance to Shebar river, and communicate by boat.

See chart No. 1,363.

* Navigating sub-lieutenant H. Sabben, H.M.S. *Pioneer*, 1877.

Tides.—It is high water, full and change, in Sherbro river as follows:—Buoy point, 7 h. 55 m.; springs rise $10\frac{1}{4}$ feet, neaps $7\frac{3}{4}$ feet; neaps range 5 feet. Bobs island 8 h. 32 m.; springs rise 8 feet; neaps 6 feet; neaps range 5 feet. York island 8 h. 40 m.; springs rise 6 feet; neaps 4 feet; neaps range 4 feet. Bum-Kittam river 8 h. 15 m., springs rise 4 feet.

Tidal streams.—The tidal streams in Shebar entrance are very strong, running at least 4 knots an hour at half tide during the dry season, so that during the rainy season this channel would probably be impassable.

The flood stream makes in Shebar entrance at 2 hours before it is low water at Bobs island, covering the banks near York and Macauley islands. When the tide is rising at Bobs island, the strength of the stream turns the tide coming from the Shebar entrance, which then passes between the islands and up Bum-Kittam river. The ebb also makes through Shebar entrance at 2 hours before it is high water off Bobs island, which latter place may be considered as the point where the tides meet.

See chart No. 617.

CHAPTER X.

SHOALS OF ST. ANN TO CAPE PALMAS.

Liberia, or Grain coast.

VARIATION IN 1900.

Cape Palmas - - - 19° 10' W.

Decreasing about 2' annually.

SHOALS OF ST. ANN.—The shoals of St. Ann commence near cape St. Ann, the western extremity of Sherbro island, and extend from it about 46 miles in a north-westerly direction. They are very numerous, and composed of knolls of fine light brown sand, apparently deposits from the waters of the various rivers in their vicinity. The outermost or North-west patches have a depth of 15 feet over them at low water, spring tides; and from them the peak of Banana islands bears E. $\frac{1}{4}$ N., distant 22 miles. Between these patches and Turtle islands, off cape St. Ann, the ground is more or less covered with others of similar character, which no description can represent so clearly as the Admiralty chart.*

Fish.—Abundance of fish may be caught by anchoring in 10 or 15 fathoms water, over sand and shells, anywhere on the shoals; but during the rainy season, from June to September, the sea is generally rough.

Tidal streams.—The tidal streams into, and from, the bays and inlets north of Sherbro island, set across the shoals of St. Ann with velocities varying from three-quarters to $1\frac{1}{2}$ miles per hour during the dry season, and it is probable that during the rains the ebb stream may much exceed this.

Directions.—There is a space of 15 miles between the North-west patches and the shoals extending north-west from the Turtle islands, in which the knolls have not less than 14 feet over them at low water; but nearer the shore, the depths become more irregular, and the shoal spots more numerous and extensive; and as Banana islands are generally obscured by haze during the dry season, so as to leave no leading object

* See Admiralty chart:—Isle do Los to Sherbro island, No. 601; scale, $m = 0.25$ inches.

visible, it is recommended not to approach any part of the shoals of St. Ann.

Vessels, therefore, from Sierra Leone bound to the southward, should give a wide berth to the North-west patches, and keep in more than 15 fathoms water, till they reach the latitude of $7^{\circ} 40' N.$ They may then steer S.S.W., gradually edging to the southward and south-eastward along the outer edge of the shoals in a depth of about 20 fathoms, till they reach the meridian of cape St. Ann, from which position, the coast being quite clear, they may proceed along it in any depth or at any distance that may be desired.

Depths off shore.—On the parallel of St. Ann shoals, and 34 miles westward of them, the depth is 290 fathoms, shoaling gradually to 13 fathoms at a distance of 18 miles, when it increases to 15 fathoms; and that depth will be found at 3 miles from their western edge.

Orontes bank.—When approaching Sierra Leone from the southward in June 1881, soundings were obtained by H.M.S. *Orontes* in 11 fathoms W. by S. $\frac{1}{2}$ S., distant 43 miles from cape Sierra Leone. The soundings then decreased to 9 fathoms and again increased to more than 16 fathoms; the bank apparently extending about 10 miles in a N.N.E. and S.S.W. direction.

This bank was subsequently crossed in the same direction in October 1881 by the steam ship *Benquela*, when Lieutenant A. M. Field, R.N., obtained soundings in 9 fathoms, and verified its position.

Turtle islands.—These islands, at the extremity of cape St. Ann, like the shoals off it, appear to be formed by deposits from the rivers near Sherbro island. They are sand-banks, gradually acquiring vegetation, and some already thickly wooded. They stand upon an extensive flat of sandy banks, with no navigable channels between them.*

Many natives are settled upon them, who appear to be well supplied with domestic fowls, fish, and bananas.

North island, 85 feet above high water, the north-western of the Turtle islands, is situated 9 miles N.N.W. $\frac{1}{2}$ W. from cape St. Ann; the tops of the highest trees upon any of the Turtle islands do not exceed 150 feet.

CAPE ST. ANN.—This cape is a low, sandy point, forming the western extremity of Sherbro island. The narrow opening between it and Turtle islands is obstructed with sand.

Coast.—From Cape St. Ann to the opening named Shebar entrance the distance is 26 miles in a south-east direction; the coast between being

See chart No. 601.

* See Admiralty chart Sherbro river, No. 617, scale $m = 1.0$ inch.

formed by a sandy beach, free from off-lying rocks or shoals, and "steep-to," having 5 fathoms water close to the shore, over a bottom of fine sand. The land is thickly wooded, the forest everywhere advancing to within a few yards of the beach.

Shebar entrance.—*See* p. 337.

COAST.—From Shebar entrance the coast trends in nearly a straight line S.E. $\frac{1}{4}$ E. for about 60 miles to the entrance of the river Gallinas, and though low and sandy, it is free from off-lying dangers, and "steep-to." *

Bank.—In August 1888, H.M.S. *Racer* struck soundings on the 35-fathoms contour in 11 fathoms water; the entrance to the river Gallinas bearing East, distant $17\frac{1}{4}$ miles.

Gallinas river.—The entrance to this river is difficult to recognise from the offing.

The action of the surf from without, and the currents of the rivers Gallinas and Sulima from within, has had the effect of throwing up a narrow barrier of sand 5 or 6 miles in length, and of thus forming between it and the shore, a long narrow lagoon, in which are several low, sandy islands, covered with trees. One or two shifting openings in this barrier allow the escape of the river water; and through them are the only channels by which boats can communicate with the lagoon and the shore.

Bar.—The principal entrance in 1839 was at the western elbow of Kaniasun island, from whence a narrow channel, through the surf, led round either its north or south extreme.

Anchorage.—The soundings from the offing are regular; trading vessels may anchor at a mile west of the above island in 7 fathoms water; vessels of war are recommended to anchor 3 or 4 miles off shore in a depth of 17 fathoms.

Landing is never practicable in ordinary boats, and none ought to attempt to cross the bar, or land through the surf without a native pilot.

Tides.—It is high water, full and change, in Gallinas river at 6 h. 45 m.; springs rise 4 feet.

Sulima river.—The Sulima, situated 3 miles south of Gallinas river, has the appearance of a considerable stream. There is no ordinary landing at Sulima, but, in 1887, it was effected in the *Goshawk's* 20-foot gig when the surf was low, but was impossible at other times even by surf boats. A wooded islet stands conspicuously in its mouth.

Manna river, about 6 miles south-east of Sulima river, is small, but though nearly closed by sand-spits extending from both sides, affords

* *See* Admiralty chart:—Africa, West coast, Sherbro island to cape Mesurado, No. 1363; scale, $m = 0.25$ of an inch; with plan: river Gallinas, scale, $m = 1.5$ inches.

access across the bar to surf boats. Generally speaking, the banks of the river are high with no mangroves; a small wooded island is in the entrance.

Boundary.—The Republic of Liberia commences at this river.

Manna point, low and rocky, with rocks above and below water, extending a third of a mile from the shore, lies $4\frac{1}{2}$ miles south-east of the entrance to Manna river. The high land in the interior, north-east of Manna point, visible from a considerable distance, is the first seen when approaching the coast from the north-westward.

Sugari and cape Mount (Marfa) rivers.—At 8 miles south of Manna point is situated cape Mount, the coast between forming a bay about 2 miles in depth, into which flow the Sugari and Cape Mount or Marfa rivers. These rivers, with Fisherman lake, have a common outlet, across which the surf breaks heavily, at $2\frac{1}{2}$ miles north-east of cape Mount. Sugari river, extending $5\frac{1}{2}$ miles in a north and south direction, and close within the outer coast, was found to have a depth of about 6 feet.*

Marfa river has depths of from 6 to 22 feet from Kru town, at $1\frac{1}{2}$ miles within the entrance, to Makwimba, situated $10\frac{1}{2}$ miles above the bar. Fisherman lake, which is 10 miles long and 6 miles broad, has in it an average depth of about 10 feet.

Cape Mount.—The headland of cape Mount consists of several hills rising to the height of 1,066 feet above high water, which, seen from a distance, have the appearance of a large island. Shoal water extends for about 2 cables from the western point of the cape; and the base of the mount, from thence for 3 miles to the south-eastward, is formed by a succession of rocky points and small sandy bays. There the coast again sinks into a low continuous beach of light-brown sand; an unbroken forest covering the face of the country, up to the summit of the cape, and extending without intermission for 40 miles in a south-easterly direction to cape Mesurado.

Communication.—The British and African Company steamers call monthly at Cape Mount.

Landing, in ship's boats, may be effected near the houses on the beach.

Half Cape Mount river.—About half-way between capes Mount and Mesurado, there is a considerable stream named Half Cape Mount river, but in the dry season it is quite closed by a bank of sand which extends across its mouth.

Anchorage.—During the dry season H.M. vessels of war occasionally anchor, in 12 fathoms water, at 3 miles off shore, between cape Mesurado and Half Cape Mount river.

See chart No. 1,363.

* See Admiralty plan; cape Mount river, chart No. 1,363.

St. Paul river.—At 8 miles south-east of Half Cape Mount river there is a small stream named the Po, the entrance to which may be known by a number of black rocks on the beach ; and 4 miles north of cape Mesurado there is a fine wide stream known as St. Paul river. A few rocks extend a quarter of a mile from the beach, for a distance of about 4 miles north of St. Paul river. From the south entrance point a dry sandy spit extends to the north-west, terminating in a shallow bar, curving towards the northern shore, and leaving a narrow channel for boats.*

Least depth in channel, 7 feet at low water.

Caldwell settlement.—On the banks of St. Paul river and along the outer shore, there are several native villages and some American factories, as well as a large settlement at Caldwell, 2 miles from the entrance, on the south bank of the river.

Mesurado river.—At 3 miles southward of St. Paul river, the Mesurado issues from behind the cape of the same name. Its entrance is rendered uncertain both in depth and position, for the sand-banks off it yield alternately to the westerly swell, and to the heavy freshes produced by the periodic rains breaking through ; sometimes it is found close to the foot of the cape, and sometimes half a mile to the northward, but usually there is from 3 to 9 feet on the bar, which is generally unsafe for any but surf boats.

Stockton creek.—This creek, 5 miles long in a N.N.E. direction, affords a back communication for boats between the Mesurado and St. Paul rivers ; the banks of this creek and Bushrod island, situated west of it, contain several thriving villages of American settlers.

CAPE MESURADO.—The north-west extreme of the peninsula of Mesurado is high in comparison with the adjacent land ; it is of rocky formation, covered with vegetation, and “steep-to.” When first seen from the westward it appears like an island.

LIGHT.—A *fixed white* light is exhibited, at an elevation of 240 feet above high water, from a pole, 40 feet in height, on the summit of cape Mesurado ; it should be visible in clear weather from a distance of 2 miles, but on many bearings it is obscured by trees, and the lights on this coast are frequently not exhibited, and under any circumstances are indifferent, so no dependence should be placed on this light.

MONROVIA.—The principal establishment on this part of the coast is the town of Monrovia, which stands on the southern side of

* See Admiralty chart :—Cape Mesurado to Baffa bay, No. 1,364 ; scale $m = 0.25$ inch, with plan Monrovia bay ; scale, $m = 0.75$ inch.

Mesurado river, immediately under the high land of the cape, and which is the residence of the president of the Liberian republic, and the seat of government. There are German, American, Dutch, Belgian, and Haytian Consuls here. About a dozen small trading schooners belong to the Liberian merchants. There are no quarantine regulations, nor is there a hospital. The population of Monrovia is estimated at 6,000, of which above 2,000 are Liberians.

Communication.—The British and African Company's steamers, outward and homeward bound, call three times a month respectively.

Supplies.—Wood in any quantity and water can be procured here. The *Ætna's* boats watered in the river about 2 miles up; but during the dry season, it has been necessary to send boats nearly 7 miles up the river, to obtain water in any considerable quantity. Bullocks are to be obtained but no sheep, while live stock, vegetables, and various small stores are occasionally to be obtained from the settlers at the town.

Anchorage.—The usual anchorage for large vessels in Monrovia bay is in 7 fathoms water, over sand, with the west extreme of cape Mesurado bearing S. $\frac{3}{4}$ W., and the centre of the town S.S.E.

Landing.—Crossing the bar of the river can generally be done in a ship's boat, provided she is manned by Krumen and steered by one who knows the place. When inside the bar, the landing is good, either at the pier or alongside a stone jetty a little higher up.

The channel at high water is near Ashmun point, but at low water the deepest channel is round the north extreme of the breakers, which are well marked.

Tides.—It is high water, full and change, in Monrovia bay at 6 h.; springs rise 6 feet.

COAST.—From cape Mesurado to the south-east the coast is formed by a sandy beach, and the whole country is covered with forest. At 9 miles south-eastward from the cape there is a low point, off which lie a few rocks, and close within the point there is some high land. From thence to Junk river, a similar low coast continues for 20 miles, with lagoons between the trees and the beach, forming long narrow lakes with a few shallow outlets to the sea, and into which several rivulets appear to drain the water of the adjacent country. Two hillocks, named the Crown and the Cockscomb, lie north-east of the largest of those lagoons.

Hooper patch, situated N.W. by W., distant $2\frac{1}{4}$ miles from the entrance to Junk river, and 6 cables from the shore, is a rocky shoal of irregular form, about a mile in length; the depths of water on it being from $2\frac{1}{2}$ to 3 fathoms.*

See chart No. 1,364.

* See plan of Junk river; scale, $m = 1\cdot5$ inches, on Admiralty chart, No. 1,364.

About $1\frac{1}{2}$ miles south-east of Hooper patch there is another small shoal of 3 fathoms, from which Marshall point bears E. by N. $\frac{1}{4}$ N., distant $1\frac{1}{3}$ miles, and Bassa point S.E. $\frac{1}{8}$ S. The ground immediately round it is in some places foul, but between it and the shore the bottom shoals gradually to a depth of 4 fathoms, at the steep edge of the bar which fronts Little Bassa and Junk rivers. To avoid this shoal, as well as Hooper patch, vessels when passing should not come within the 10-fathoms line.

There is a passage 4 cables wide between these shoals and the shore, in which the depths are from 4 to 6 fathoms, and vessels using this passage should keep near the shore in about 5 fathoms water.

Junk river.—From Marshall point, its western entrance point, a tongue of sand, partly dry and partly covered with heavy breakers, extends three-quarters of a mile to the southward, and close round the southern edge of these breakers is situated the entrance to Junk river.

Least depth.—On the bar there are only 4 feet at low water, and the channel is very narrow; but inside it deepens to $1\frac{1}{2}$ and 2 fathoms; the deepest water is found by steering towards the eastern shore, round the hook at the extremity of the tongue of sand.

Marshall, a Liberian settlement, stands on the west side of Junk river, about a mile from the bar; abreast of it there are 3 and $3\frac{1}{2}$ fathoms water. At about three-quarters of a mile above Marshall the Junk river divides into two branches, one running east and the other north-west; the eastern branch is said to be navigable for a distance of 18 miles, with depths in it of from 2 to 5 fathoms.

Little Bassa river.—The mouth of this river is situated one mile south-south-east of Marshall point, but it is so completely obstructed by prolongation of the sandy tongue from that point that it is inaccessible even to boats.

Anchorage.—Vessels may anchor off either Junk or Little Bassa rivers in 7 or 8 fathoms water, on a clear bottom of sand and mud; northward of the parallel of Brazier point the ground is foul.

Tides.—It is high water at Junk river, at full and change, at 5 h. 45 m.; springs rise 5 feet.

BASSA POINT, lying one mile south-east of Brazier point, is a small rocky cliff, thickly wooded, with sandy bays on either side. Inland from it distant 10 miles, and bearing N.E. $\frac{3}{4}$ E., there is a remarkable hill named the Saddle, which rises 1,071 feet above high water, and appears to be the western extremity of a range of high land, extending 24 miles in a

south-east direction to mount St. John. These hills, visible for 30 miles in fine weather, are useful marks on this uniform stretch of low coast.

Long-reef point.—At 9 miles south-east of Bassa point is situated Middle Bassa, where there is another Liberian factory; and at 3 miles farther in the same direction lies Long-reef point, so named from a barrier of rocks, which, commencing about one mile north of the point, extends parallel with the shore for a distance of about 4 miles, at a distance of 3 cables from the coast. The ground in the vicinity is all foul, and S. by W. $\frac{2}{3}$ W., distant $2\frac{1}{4}$ miles from the point, in the stream of 10 fathoms there is a sunken danger with a depth of $4\frac{1}{4}$ fathoms on it.

Lagoons.—Between Bassa and Long-reef points there are some lagoons at the back of the beach, and at about $1\frac{1}{2}$ miles south-east from the former point is situated a small red and white cliff, which renders the spot remarkable.

St. John river.—A slightly indented coast, wooded throughout and apparently populous, extends from Long-reef point to Grand Bassa point, a distance of $10\frac{1}{2}$ miles. North of the latter, distant $2\frac{1}{2}$ miles, a considerable river, named the St. John, and two smaller streams, the Mechlin and Benson, discharge themselves through one common opening into the sea.

The coast in the vicinity of Grand Bassa is low, but the Bassa hills, about 10 or 12 miles inland, may be distinctly seen in clear weather.

Grand Bassa.—The American colonists of Liberia have two small settlements at St. John river; Edina, situated on the northern side of the opening, and Grand Bassa, now more generally known as Buchanan town, on the opposite bank; palm oil, palm kernels, camwood, and piassava are exported. Buchanan town is divided into Upper Buchanan, which is situated east of Macdowell point; Middle Buchanan, north of Waterhouse point and Lower Buchanan or Fish town, which is the business centre and port of call, steamers anchoring off Bassa cove.

There are three principal trading factories at Lower Buchanan, all of which are two-storied buildings. The northern, a German factory, has a verandah painted white, and a flagstaff standing to the northward of it; the next, south, is coloured brown, and has a white roof, and the English factory, further south, is painted reddish brown, has a verandah and a red roof with a small flagstaff in the centre.

The entrance to the river is obstructed by a shallow bar, the least dangerous passage over which is close to the sandy spit off Macdowell point, its southern entrance point; inside, the water deepens to 2 and 3

fathoms, abreast of each of the settlements. In very fine weather vessels of 200 tons burthen have crossed the bar.*

Communication.—The British and African Company's steamers call fortnightly.

Landing at Upper Buchanan is at times exceedingly dangerous, but good landing in a ship's boat, may be effected at Lower Buchanan, abreast of the English factory.

Anchorage.—About a mile W. by S. of the opening of St. John river, there is good anchorage in 6 or 7 fathoms water, over black mud, with the northern houses at Edina bearing about N.E.

If intending to anchor off Bassa cove, the second German factory already described, should be steered for bearing E. by S. $\frac{3}{4}$ S., and anchorage taken up in 6 fathoms water. This German factory may also be recognised by its having a large cotton tree in front, and two large trees behind it.

Niobe reef.—Several patches of foul ground, and one dangerous reef, named Niobe reef, on which the sea breaks furiously, lie north-west of the entrance to St. John river. The outer edge of Niobe reef is a mile off shore, and bears W. by N. $\frac{5}{8}$ N., distant $1\frac{7}{10}$ miles from Edina point, the northern entrance point of St. John river; vessels standing in should bring the entrance to St. John river to bear E. by N. $\frac{1}{2}$ N.

Two smaller groups of breaking rocks are situated between Niobe reef and Edina point; the western lies half a mile east of the south extreme of Niobe reef, the other 2 cables W.S.W. from Edina point.

Wreck.—The wreck of s.s. *Calabar*, with two masts and funnel showing above water, lies sunk in a depth of $6\frac{1}{2}$ fathoms at low water, spring tides, to the southward of Grand Bassa.

From the wreck the west extreme of Macdowell point bears N.N.E. $\frac{7}{8}$ E., distant $1\frac{3}{10}$ miles, and the northernmost town S.E. by E.

Waterhouse bay.—Southward of Macdowell point the shore recedes a little, forming Waterhouse bay, which is full of detached rocks and reefs. Snapper reef, the northern, lies half a mile W.N.W. from Waterhouse point, and always breaks.

Rock.—A rock, small in extent and consisting of several sharp pinnacles, with a least depth on it of $2\frac{1}{4}$ fathoms at low-water, spring tides, lies in the anchorage of Waterhouse bay, with the Agent's house, Grand Bassa, bearing N.E. $\frac{1}{8}$ E., distant $1\frac{9}{10}$ miles; the outermost Dhuat rock S.S.E. $\frac{7}{8}$ E.

Buoy.—A conical buoy, painted black, generally marks this rock, but it cannot be depended upon being in position. See Caption, buoyage, page 33.

* See Admiralty plan :—Edina and Grand Bassa, scale, $m=1\cdot5$ inches, on chart, No. 1,364.

Grand Bassa point, composed partly of sand and partly of rocks, forms the south entrance point of Waterhouse bay. From the point the Dhuat ridge of rocks projects a quarter of a mile to the north-west, and extending the same distance from their extremity, a sunken reef, named Yellow Will, assists in sheltering from the sea the little nook known as Bassa cove; Yellow Will reef only breaks occasionally. Bissaw river runs into this cove, but it is inaccessible to boats.

Tides.—It is high water, full and change, at Grand Bassa and Edina at 5 h. 50 m.; springs rise 4 feet.

TOBOKANNI.—At $4\frac{1}{4}$ miles S.S.E. $\frac{1}{4}$ E. from Grand Bassa point is situated Tobokanni, a large native village; the coast between being thickly wooded, and formed of small rocky points and sandy bays.

Tobokanni rock, a detached block of stone a few feet above water, is the termination of a reef projecting from Tobokanni point, which is low, angular and situated nearly a mile south of Tobokanni village; at about a mile, W. by S., from Tobokanni point, there is a sunken rock on which the sea constantly breaks.

Coast.—Continuing to the south-eastward from Tobokanni village, the coast is in general rocky, with some sandy bays between the points, and these are fronted by numerous reefs, which extend in some places half a mile from the shore, leaving a boat channel within them.

Young Sesters.—The reefs above mentioned extend 8 miles along the coast, so far as Trade town, but their continuity is broken at Young Sesters, about 4 miles south-east of Tobokanni point; here trading vessels sometimes communicate, and boats can pass inside of the reefs to New Sess river, the mouth of which is always accessible to canoes, through this opening.

Trade town, large and populous, is situated on the western bank of a small river about 4 miles south of Young Sesters; it has both an American and an English factory.

Anchorage.—There is anchorage off Trade town, at $1\frac{1}{2}$ miles from the town, in 10 fathoms water, over a muddy bottom, with mount Tobacco bearing E. $\frac{1}{4}$ N., and the town about E. by N. $\frac{3}{4}$ N.

Trade town rock.—At nearly 2 miles south-south-east from Trade town and about a mile from the shore there is an isolated rock, on which the sea always breaks.

Little Kulloh or Kurrau river, 4 miles south-east of Trade town, is small but accessible to boats, fresh water may be obtained there

See chart No. 1,364.

from both wells and springs; at the town, a mile further south, there is good landing, under the shelter of a rocky point.

Little Kulloh rocks.—At three-quarters of a mile S. $\frac{1}{2}$ E. of the town of Little Kulloh, and a cable off shore, there is a sunken rock; and farther on, in nearly the same direction, but more than half a mile off shore, there are several other rocks, with a channel of 3 fathoms water between them and the mainland. The coast in the vicinity of these rocks rises in rocky cliffs to 40 and 60 feet above high water, with large irregular blocks of granite on the beach, over which the sea breaks heavily.

Grand Kulloh.—The entrance to Grand Kulloh river, situated 5 miles south-east of Little Kulloh river, is closed by rocks and sand; and from thence to the southward the shore becomes low and undulating, with a coast line formed by numerous rocky points and sandy bays, off which, at a distance of from one to 2 cables, are some rocks with a passage for boats inside them. Grand Kulloh village is situated $1\frac{1}{2}$ miles south-east of the entrance to the river. Off Errick, close north-west of Grand Kulloh village, there is a large black rock, connected by a reef to the shore.

Tembo river, 3 miles south-east of Grand Kulloh village, is a small stream half a mile northward of Tembo point, and only occasionally accessible to boats; there is a small British trading factory at Tembo where the landing is said to be good.

Tobacco mount, a conical hill 880 feet above high water, situated 13 miles north-north east of Tembo river, is a valuable mark for recognising the anchorages on this part of the coast.

Fen and Manna rivers.—From Tembo river to Grand Sestos, the coast is low and thickly wooded, with a sandy beach and some off-lying rocks. The entrances to the Fen and Manna, two small streams, are situated in the above space; the former is nearly closed by a ledge of black rocks, but canoes can enter by keeping close to the shore on the western side of them; at the mouth of Manna river may be seen the remains of an old factory.

Fen rocks.—At three-quarters of a mile south-south-west of Fen river are situated Fen rocks, on which the sea breaks; other sunken dangers lie eastward of them, and the soundings are very irregular for 5 miles between them and Manna rocks.

Manna rocks lie a little more than a mile from the shore, and N.W. by N., distant 4 miles from the entrance to Cestos river, they are of a black colour and a little above high water; a shoal bank extends half a

mile south-east of Manna rocks. There are several sunken rocks in this vicinity, on which the sea breaks; one bearing from Manna rocks N. $\frac{1}{2}$ W., distant 6 cables; another N.E., distant 4 cables; a third E. $\frac{1}{2}$ S., distant 6 cables, and others at a distance of a mile bearing S. $\frac{1}{2}$ E.; all of these may be avoided by keeping in the offing in not less than 12 fathoms water.*

Cestos bay.—Cestos point lies 4 miles, S.S.E., from Manna rocks, and between them is situated Cestos bay, in which the soundings are irregular both in depth and quality of bottom, which latter generally consists of coarse brown sand or black mud.

Cestos river flows into the southern part of Cestos bay, its entrance is obstructed by an extensive bar extending from St. George point (off which are some large, black, detached rocks), to about a mile north of Isaac point, the northern entrance point.†

Bar.—In the middle of the bar (which breaks heavily) there are some rocks, lying 4 cables, N.N.E., from St. George point, which divide the channel into two parts, but in neither of them is the depth more than 9 feet at high water. The floods during the rainy season, however, produce such changes in the spits which project from the rocks, or from the opposite points, that it is always advisable, when entering, to employ a native to pilot the boat. After crossing the bar the water deepens to $2\frac{1}{2}$ and 3 fathoms, but again shoals, to one fathom, when past the narrows.

Cestos reef.—Off Cestos point there is much foul ground; a broad reef projects from it for a distance of half a mile to the south-westward; a rock with 3 feet on it lies close west of this reef; and S.S.W. distant $1\frac{1}{2}$ miles from the point, a schooner is reported to have struck in a depth of 11 feet, though 5 fathoms was the least depth the surveying boats could find in the assigned position.

Spence rock, with 12 feet water over it, and which usually breaks, lies W. $\frac{2}{3}$ S., distant $1\frac{1}{4}$ miles, from Cestos point; from the rock the factory on St. George point bears E. by N. $\frac{3}{4}$ N.

Anchorage.—Convenient anchorage, in 5 and 6 fathoms water, will be found with St. George point, on which there is a Liberian factory, bearing S.E. distant about three-quarters of a mile; and Cestos point South. Wood and water may be easily obtained here.

* See plan of Cestos bay on Admiralty chart No. 1364; scale, $m = 1.5$ inches.

† The ship *Corisco* in 1885 is reported to have struck on an isolated rock, situated at 5 miles off the coast abreast of the river Cestos. The rock is in latitude $5^{\circ}27'S$, and the least water on it is 16 feet. The existence of this rock is exceedingly doubtful.

Directions.—Cestos reef and the above-mentioned rocks are the more dangerous because they are all so steep that the lead can give little or no warning of approach. As no good clearing marks can be given, a stranger should employ a pilot in entering the bay for the first time. A vessel passing along the coast may avoid them all, by keeping outside of the depth of 14 fathoms.

Tides.—It is high water, full and change, in Cestos bay at 5 h. 20 m.; springs rise 4 feet.

PUA AND POBAMO RIVERS.—From Cestos point southward to Rock Sess factory the coast forms a sandy bay, into which flows the Pua and Pobamo rivers, both small; the former is $3\frac{1}{2}$ miles south-east of the point, and the latter distant 7 miles in the same direction. Pua river is quite closed by rocks and sand in the dry season, but during the rains it is entered by canoes.

Depth.—The Pobamo has a depth of 6 feet, and may be entered close to the beach on the north-west side, where the water is tolerably smooth, being there sheltered by a ledge of rocks which extends from the south-east point of the entrance, and forms a kind of natural breakwater.

Pobamo rocks.—Westward of this ledge, and extending to Rock Sess factory, with a passage inside of it for boats, there is a broad reef, which commences about a mile W.N.W. of the mouth of Pobamo river. Westward of this reef there are several rocks, two of which always show. Pobamo rock is low and black, from it the south-east entrance point of Pobamo river bears E.S.E., distant $1\frac{3}{4}$ miles; a small sunken danger bears N.E., distant half a mile from Pobamo rock, and another rock bears N.W. $\frac{1}{2}$ N. from it at the same distance.

A rock above water, and, like those which have been described, "steep-to," and isolated, lies S.W. $\frac{1}{2}$ W. distant one mile from the entrance to Pobamo river.

New river.—A small river runs into the sea at Rock Sess point, a little to the south-east of which there is a factory, and one mile farther, in the same direction, is the entrance to New river. The intermediate bay is obstructed by sunken rocks, though boats will find a passage with depths of 4 and 5 fathoms between them.

Diabolitos reef.—New river is sheltered by an extensive reef, upon which are several black rocks which retain their Portuguese name of Diabolitos. Foul ground, with irregular soundings, extends fully 2 miles to seaward of this reef, and though nothing less than 3 fathoms was found, yet on the two shoals of $4\frac{1}{2}$ and $5\frac{1}{2}$ fathoms, situated 2 miles south-west of New river, the sea was seen to break.

On Diabolitos reef there is a rock having a conspicuous green tuft of brushwood on its summit, which may easily be mistaken, in thick weather for Bai Ya rock 6 miles to the south-east.

Bruni river.—At a mile south-east of New river there is another rivulet without a practicable entrance; and at two miles farther, in the same direction, a long spit has been formed by Bruni river, which is seen over it, running in a parallel line to the coast for upwards of a mile and a half. In the rainy season the freshes occasionally break through this spit, and convert it into a long, narrow island. The entrance is always open to light boats and canoes, though much obstructed by rocks and sands.

Bai Ya or Devil rock.—There are several rocks off Bruni river, both above and under water: the most conspicuous of them is the Bai Ya, situated one mile from the shore, standing 60 feet above the sea, and appearing white and bare when seen against the coast line. Northward of it, distant $1\frac{1}{2}$ miles, there are three sunken rocks which generally break; to the eastward, between it and Spence factory, which stands on the shore $1\frac{1}{4}$ miles south-east of Bruni river, there are some rocks above water, with a detached reef to the southward of them, and an isolated danger west of them.

Westward of Bai Ya rock there are four other rocks. The nearest, which is dry, lies half a mile, S.W. $\frac{1}{2}$ W., from it; the second (Outer rocks) bears S.W. $\frac{1}{2}$ S., a little more than a mile distant, and is of some extent, part of it shows above water; a third, bearing W. by S. $\frac{1}{4}$ S., and nearly $1\frac{1}{2}$ miles distant, is small, with 4 feet water over it; and the fourth, lying N.W. by N. from the rock, distant not quite a mile, is only seen by its breakers.

Sangwin river.—Eastward of Spence factory the coast forms a bight, and then, after passing the Kuzu river, which is small, and 2 miles of straight sandy beach, the Sangwin river is reached. This is one of the principal streams that water this part of the coast. At first sight it is difficult to perceive the entrance, as a long ledge of rocks, from Wilson point, on the south side of the entrance, and a high sandy spit, from the northern point, seem both to cross over to the opposite shores.*

Greatest depth.—It is possible to carry 10 feet water into the river, by keeping in the deepest channel, which is between Wilson point and the rocky shoal a quarter of a mile westward of it. The channel, is very narrow, and on rounding Wilson point it deepens to 5 fathoms till the narrows are passed.

See chart No. 1,364.

* See Admiralty chart: Baffu Bay to Grand Berebi, No. 1,365; scale, $m = 0.25$ of an inch; with plan:—Sangwin river: scale, $m = 1.5$ inches.

Fresh water.—Towards the last quarter of the ebb tide the water at Sangwin point, on the north side, just within the entrance, is fresh and good; and when the bar is smooth, it will be found a convenient place for obtaining wood and water.

Lagoon.—Close east of Sangwin river, and just within the beach there is a lagoon with three branches, which in the rainy season are probably connected with the river.

Tides.—It is high water, full and change, in Sangwin river at 5 h. 15 m.; springs rise 4 feet.

BAFFU POINT lies nearly 5 miles S.S.E. from the mouth of Sangwin river, the intermediate coast receding and forming Baffu bay about $1\frac{1}{2}$ miles deep, into which two small rivers discharge close north of the point; there is much foul ground in the bay, though the beach seems to be generally clean.

Baffu rock.—Vessels working along shore should not approach this coast too closely, for Baffu rock, with 12 feet water over it, lies in the middle of the bay, bearing from Baffu point N.W. $\frac{3}{4}$ N., distant $2\frac{1}{3}$ miles, and from Wilson point, at the mouth of Sangwin river, S. $\frac{3}{4}$ E., distant $2\frac{3}{4}$ miles.

Baffni river.—The northern of the two rivers lying north of Baffu point, is named the Baffni, and has a very narrow entrance; the other is closed by a shallow sand bar, and the rivers are connected by one of those narrow lagoons, which are so common on this coast.

The Depth in the entrance of Baffni river is 6 feet.

Directions.—Baffu point should not be approached within half a mile to the westward, as there is a sunken rock off its pitch; another rock lies close southward of it, and irregular reefs three-quarters of a mile in length project to the northward. Fair anchorage may be obtained in 8 fathoms water, over mud and sand, with the point bearing S.E. $\frac{1}{2}$ S. about a mile distant.

COAST.—From Baffu point to Tassu point the coast trends south-east for a distance of $6\frac{1}{2}$ miles. A low and thickly-wooded country lies between them, with several streams of water barred up by the beach; many rocks lie near the shore, as well as at a short distance in the offing.

Kru country.—About this part of the coast the Kru country begins; its very numerous inhabitants, whose superior industry and docile habits, when compared with other African tribes, are proverbially known.

Communication between Liverpool and the Kru coast is about twice every month by the British and African Company's steamers.

Tuba river.—Between Tassu point and the next point of land to the southward, issues the small river Tuba, in front of which there is a high rocky ledge, dividing the channel; the western branch is the safer.

Depth.—At low water there are not more than 3 feet in the western branch.

Sha rock.—Off Tassu point, and in the stream of 9 or 10 fathoms, there is a long range of rocks and dangers, three of which—the Sha, Wya, and Keoba—are above water. Sha rock lies 2 miles W. by N. $\frac{3}{4}$ N. from Tassu point; there is deep water round it, except to the northward, in which direction breakers extend about 300 yards.

Wya rock is large, and has reefs half a mile in length, extending both to the northward and southward; it bears S.S.E. $\frac{3}{4}$ E., distant $1\frac{1}{2}$ miles, from Sha rock, and S.W. by W. from Tassu point.

Keoba rock.—At about a mile south-east from the southern reef off Wya rock, and S. by W. $\frac{1}{2}$ W. from Tassu point, there is a rock with 9 feet water over it; and at another mile, still farther to the south-east, is situated Keoba, a large rock above water. South-east distant one mile from Keoba rock there are breakers; and at 3 miles S.S.E. $\frac{3}{4}$ E. from it with Grand Butu point bearing E. by N., lies Yule rock, the southern of this chain of dangers, which extend almost 7 miles from Sha rock, in a direction nearly parallel to the coast.

Little Butu is a large village situated about 2 miles south-east from Tassu point, and 4 miles farther, in the same direction, is Grand Butu on a projecting point of the coast, behind which lies the mouth of Grand Butu river. In the space included between the line joining Keoba and Yule rocks and the shore, and between Little and Grand Butu, the general depths are 6, 7, and 8 fathoms, but interspersed with many shoals, the particular description and positions of which would be useless. The shore is likewise covered with large rocks; several small rivulets expend themselves in the sandy beach, and the whole coast is densely peopled.

Grand Butu.—Grand Butu point, on which is the town of Grand Butu, is easily recognised by its projecting form, and by a hill, covered with trees, and 266 feet above high water, situated about a mile south-east of it. A river winds round between the foot of this hill and the coast, after having run for several miles parallel to the shore, and is apparently a branch of the river Sinu.

A few rocks lie close off Grand Butu point, but from thence to Sinu bay the coast, though low, has a clean sandy beach, and between Yule rock

and Sinu bay there are no detached shoals, so that vessels may stand in with safety ; the soundings, however, are irregular, with occasional patches of rocky ground, necessitating care in anchoring.

Blubarra point, forming the southern extremity of Sinu bay, is composed of three small rocky points with sandy bays between them. North point, at the mouth of Sinu river, is about 57 feet high ; the middle point is 41 feet high ; and the lands rise from the South point to a height of 60 feet above high water. Until the point bears to the eastward of N.E. no houses are seen.*

Sinu Bay.—At about three-quarters of a cable north of North point there are some rocks above water named Allen rocks, with a clear passage between them and the point into Sinu river ; another open passage will be found between Allen rocks and Middle reef ; and a third between this latter and North reef, which extends nearly across to the northern shore.

North and Middle reefs break, and to the westward of them there are patches of 4 and 5 fathoms, the outer of these, with the former depth, lying S.W. by W. $\frac{1}{4}$ W., distant about one mile from the north extreme of North reef. These reefs were the only dangers discovered in Sinu bay, and vessels may safely anchor at about half a mile W.N.W. of Blubarra point in 8 fathoms water, but the bottom should be previously examined, for, though generally composed of clean sand, it contains several small foul patches.

Sinu river.—There are three channels by which boats may enter Sinu river—between North point and Allen rocks—between Allen rocks and a large oval sand-bank to the eastward of them—and between that bank and Fishtown beach. The first is the best.

Least depth.—By rounding North point closely, 5 or 6 feet may be carried over the bar in the first channel at low water. The bar is very narrow, and, when crossed, the river suddenly deepens to 3 and 4 fathoms, but shoals again quickly after rounding Fishtown point, when the deepest water will be found close along the northern shore. Water and wood may be obtained here.

The American Colonisation Society have built a factory on the right bank of Sinu river, a little to the northward of Fishtown point.

Tides.—It is high water, full and change, in Sinu bay at 5 h. ; springs rise 4 feet.

Bluba and Plassa rivers.—At 2 miles south-eastward of Blubarra point the sandy beach is interrupted by a rocky projection, about

* See plan of Sinu bay ; scale, $m = 1.5$ inches on Admiralty chart No. 1,365.

a mile inland of which a small round hill will be seen, but with that exception the coast preserves its straight, low, and sandy character for 11 miles in a S.E. $\frac{1}{2}$ E. direction to Little Kru, and a long narrow lagoon parallel to the shore, extends the whole distance, separated from the sea only by a narrow ridge of sand.

This lagoon is supplied by two rivers, the Bluba and Plassa, and a single opening through the sandy barrier serves as a common outlet to the sea for both of them. Little Kru river communicates also with the lagoon, but in the rainy season it forces an opening for itself through the barrier. From Little Kru river the coast bends outwards to the rocky point of Settra Kru.

Mount Plassa is a small wooded hill with a round summit 290 feet above high water, to the north-eastward of the entrance of Plassa river and $2\frac{1}{2}$ miles distant from the coast.

Dangers.—In the eastern half of the space between Blubarra point and Settra Kru there are several off-lying rocks.

The westernmost of these lies a little more than a mile from the beach, with mount Plassa bearing E. by N. $\frac{1}{8}$ N., and a little open north of the common opening of the Plassa and Bluba rivers, which bears E. $\frac{3}{4}$ N.; it is very small, with a depth of 6 fathoms close round it, and generally breaks.

There is an extensive rocky shoal situated S. by W. of the above opening, and W.N.W. of the large tree at Little Kru; some of the rocks on this shoal are above water, others covered, and some only just breaking, but all "steep-to."

At a mile S. by W. of this shoal there is a single rocky head which generally breaks; and even if it should not show, it may be easily avoided by keeping Kru rock bearing to the eastward of S.E.

Kru rock is a bare irregular-shaped mass of stones, with 5 fathoms water close round it, except to the eastward, where it is connected with other rocks and long reefs which extend in the form of an S, nearly to the point of Settra Kru. The western edge of Kru rock bears W. by N., distant 2 miles from that point, and though it is sufficiently obvious during the day, and the breakers generally audible at night, yet vessels are recommended after dark, to keep in a depth of at least 16 fathoms.

From the S-shaped reefs connected with Kru rock, other branches diverge to the north-west and north-east, so as nearly to fill the space between Little Kru and Settra Kru.

Little Kru.—At this settlement there is a palm-oil factory belonging to some English merchants, and ordinary boats may conveniently land

under the shelter of a ledge of rocks which projects from the point. The large tree which marks the position of this village stands on its eastern side, and may be plainly seen from the offing.

Settra Kru.—At this settlement there is also a remarkable tree and a conspicuous house, which may be distinguished from a long distance. Boats may land safely on the north side of the point on which the village is situated; off the extreme of this point are situated some black rocks.

Kruba.—From Settra Kru, the beach trends 3 miles to the south-eastward, with long ledges of dry rocks extending from the projecting points. At that distance is situated the village and river of Kruba, cattle may be obtained at the village, and the entrance to the river is open in the rainy season.

Neatano point, situated $1\frac{1}{4}$ miles south-east of Kruba river, is prolonged by a reef and off-lying rocks, which are nearly connected to the southern shoals off Kruba river.

Wreck.—From the wreck of the steamship *Carlos* sunk in a depth of 5 fathoms, Neatano point bears N.E. by E. distant three-quarters of a mile.

Sunken dangers.—On the bearing of S.S.W. from Settra Kru, distant two-thirds of a mile, there is a rock which breaks, with 7 fathoms water close to it; about a mile W. by N. from Neatano point there is another breaker, with 10 fathoms close to; and in the space between those two rocks, but nearer to the shore, there are several detached shoals with deep water close to.

In the stream of 14 fathoms, S. by W. $\frac{3}{4}$ W., distant $2\frac{1}{2}$ miles from Neatano point, there is a rocky bank, with 8 fathoms water over it, and at $1\frac{1}{2}$ miles E.S.E. of this bank, in the stream of 11 fathoms, the natives allege that there is a rock nearly awash; though neither the surveying boats nor the German vessel-of-war *Victoria*, in 1881, could find it, nor did the soundings indicate any rise in the ground, yet on this extraordinary coast it is possible that such a rock may exist, as most of the dangers are “steep-to.”

In 1896, the German steamer *Thekla Bohlen* struck on a rock, with 20 feet water over it, and 12 to 13 fathoms around, lying about $1\frac{3}{4}$ miles south-east of this 8-fathoms bank; from the rock King Wills point bears East, distant about $2\frac{1}{3}$ miles, and Neatano point N. by W.

Vessels, whose business leads them in-shore, must keep a sharp look-out for these numerous rocks, but those which are merely running along the coast, are advised not to approach it within 3 or 4 miles, nor stand into less water than 25 fathoms.

Coast.—At three-quarters of a mile south-east from Neatano point lies Tuto point, from which a reef extends half a mile to the southward. From thence to Great Nanna Kru village the coast is a low sandy beach fronted with many rocks; midway between them is the outlet of the small river Dehweh, and behind the beach is a lagoon, about $1\frac{1}{2}$ miles in length, which is supplied by the two branches of this river.

King Wills bay.—From Great Nanna Kru village the coast bends to the south-eastward for a distance of one mile to King Wills point, forming King Wills bay, near the centre of which there is a small islet about 15 feet high, covered with brushwood. The shore appears to be well settled, and two small English factories are established here for the collection of palm oil, there being tolerably good landing near them on either side of the islet, which affords some little shelter.

There are a few rocks lying 2 cables north-west of the point of King Wills town, and others off the point two-thirds of a mile further eastward; inside of these latter rocks there is a narrow 3-fathoms channel.

Sperling rock.—This dangerous rock, which is small, “steep-to,” and seldom breaks, has over it a depth of 9 feet, and lies S.W. by W., distant about $1\frac{1}{4}$ miles from King Wills point, and S.S.E. $\frac{1}{2}$ E., distant $4\frac{3}{4}$ miles from Neatano point. Depths of 9 to 11 fathoms were found in all directions close to Sperling rock.

Anchorage may be obtained in 10 fathoms water, with King Wills point bearing E.N.E. distant $1\frac{1}{2}$ miles, but foul ground exists north-west of that position.

Uro river, west mouth.—The western mouth of Uro river is situated $3\frac{1}{4}$ miles south-east of King Wills point; the intermediate coast is low and sandy, with a lagoon inside the beach; a short distance east of the lagoon there is a rocky shoal, lying $1\frac{1}{2}$ cables from the shore, with a $2\frac{1}{2}$ -fathoms channel between; it is “steep-to” on its outer side.

Swallow rocks, consisting of two ledges which generally break, and a 4-fathoms rock half a mile south-west of them, are situated south-west of Uro river, west mouth, distant $1\frac{3}{4}$ miles. From the southern ledge the west mouth of Uro river bears N.E. by E. $\frac{1}{4}$ E. and is in line with a hill, 263 feet above high water, which stands $2\frac{1}{2}$ miles inland. There are depths of 10 fathoms close to the ledges, and 8 fathoms within a cable of the south-west rock.

Uro river, east mouth.—The eastern branch of Uro river falls into the sea at 3 miles east of the western branch, and the whole space between is occupied by successive chains of rocks which extend more than

a mile from the beach. This mouth is concealed from vessels in the offing by large granite boulders, but it, as well as the western branch, is accessible to canoes. Subono, or Little Wappi, a large native village, stands on the right bank of the river near its mouth.

Great Wappi point.—South-east from Subono, distant $1\frac{1}{2}$ miles across a small bay, is situated Great Wappi point, near which is a small lagoon which extends in both directions along the coast, and on the side of which formerly stood another native town named Great Wappi. The outlet of the lagoon is obstructed by rocks, and a broad ledge, partly above and partly under water, extends in a westerly direction for nearly a mile from the shore.

Flat island.—South from the western extremity of this ledge, distant about a mile, and S.W. by S. from the opening of the lagoon, there is a rock named Flat island, known to the natives as Totwarra. There are depths of 10 fathoms within half a mile of this rock to the westward and southward, but on its eastern side reefs and shoals extend nearly to Middle Nifu, extending far to the southward, and almost filling the whole space between the outer reef and the shore.

Rock.—In 1894 the German steamer *Adolph Woermann* struck on a rock, which had depths of from 5 to 11 fathoms round it; from the rock Flat island bore N.E. by N. distant three-quarters of a mile.

CAUTION.—At about $3\frac{1}{2}$ miles S.W. from Flat island, a sunken rock was found by H.M.S. *Sappho* in 1856, but its exact position is not known.

Landing.—Inside of these reefs, and sheltered by them, there is good landing at Little Nifu, on the western side of a rocky point, on each side of which there are streams of water, open in the rainy season.

Middle Nifu.—At this place there are two small rivers, one coming from the north-west and the other from the north-east; they unite in a short lagoon, the outlet of which is open only in the rainy months. The town lies between these, and a mile farther eastward there is another native town named Great Nifu, where there are two white houses and off which a shallow reef projects, three-quarters of a mile, in a S.W. $\frac{1}{2}$ W. direction, with a detached rock, with a depth of 3 fathoms over it, situated a quarter of a mile westward of the extremity of the reef.

Dru River, 2 miles south-east from Great Nifu, is a stream of some magnitude; the best entrance is round the southern point, which is low and rocky, with some large off-lying rocks; the northern entrance point is a sandy spit, which extends well over towards those rocks. Off

the mouth of Dru river there are several dangers; one of them, named by the natives the Druta, is a large block of stone above water; a sunken reef extends from it to the westward, and to the northward there is a large patch of foul ground.

A ledge, three-quarters of a mile in length, lies south-west of the south entrance point of the river, but there is a 3-fathoms channel between them. Two breaking rocks may be seen to the eastward of this ledge, and the soundings in its vicinity as well as round Druta rock are suspiciously irregular, with rocky ground; so that, unless with a view of communicating with the shore, no vessel should venture to approach it here within a depth of 20 fathoms, or at a distance of about 3 miles.

Depth.—The bar has a depth of 6 feet over it, inside of which it deepens to 4 fathoms.

Esereus river.—From the rocky southern point of Dru river, the coast trends, in a south-east direction, for about $2\frac{1}{2}$ miles to Esereus or Baddu river, close to the mouth of which there is a large rock 20 feet above high water, and some detached rocks a little to the westward of it, as well as a sunken danger on which the sea breaks; there is a channel with 2 fathoms water in it, suitable for boats, close along the coast inside of all these rocks.

Baddu.—Baddu consists of four towns, which stand on the coast on the western side of the entrance of Esereus river; in their vicinity the ground has been well cleared, and produces abundance of rice.

Landing.—There is tolerably good landing under the lee of the large rock above mentioned. The entrance of Esereus river is only passable by canoes.

Dead islet.—Baddu point, low and sandy, curves to the southward from the mouth of Esereus river; half a mile off its pitch there are several rocks above water (the largest of which is named Dead islet) and several outlying reefs.

Baddu shoals.—The outermost of these dangers bears W. $\frac{3}{4}$ N., distant 2 miles from Dead islet, and another shoal head lies N.W. by W. half a mile from the same islet; the several dangers in this vicinity are known by the general name of Baddu shoals.

Monkey rock lies S. by E., distant 2 miles, from Dead island, and between them are several reefs and rocks, some of which show above water; Monkey rock lies $1\frac{1}{4}$ miles from the shore, and, like the breaker to the westward of it, is in the stream of 10 fathoms; the soundings for half a mile south-westward of it are irregular, and the bottom foul and rocky.

Castle rock.—Several isolated rocks are scattered along this part of the coast; a large one, named the Castle, bears S.E. by E. $\frac{1}{4}$ E., distant $2\frac{1}{2}$ miles, from Monkey rock; it rises steeply from a depth of 10 fathoms, and is about half a mile from the beach; vessels should not stand so far in as to bring these two rocks on opposite bearings.

Between the two points abreast of Dead islet and Castle rock there are several small rivers and lagoons, but they are all barred in the dry season; the village of Sesstown, where there are two white houses, is about $1\frac{1}{4}$ miles north-west of Castle rock. There is a safe channel for boats, with depths of 2 or 3 fathoms in it, within 200 yards of the beach, leaving the shoals and islets outside to seaward.

Shoal.—Abreast of Sesstown S.S. *Boma* touched upon a shoal with about 4 fathoms water over it, and 9 fathoms close-to; there was a heavy swell at the time, but no breakers were observed, although possibly there may be less water; from the shoal, Castle rock bears E. by S. $\frac{1}{2}$ S., distant $1\frac{9}{10}$ miles, and Baddu point N. $\frac{3}{8}$ W.

Feruwa river.—These shoals terminate about a mile eastward of Castle rock, and from thence to the river Feruwa the sandy beach is straight and safe to approach. Feruwa river, with its apparently large opening, is only accessible to boats and canoes when the bar is smooth; its western entrance point is a low spit of sand, the eastern point a bold rock, on which stands the native town of Katu.

Katu rocks.—Rocks and boulders again front the coast at Feruwa river, there being three rocks above water near its entrance, with reefs extending from them nearly half a mile to the southward.

A large rocky shoal, with 6 fathoms water on it, was found at a distance of nearly 2 miles W. by S. of Katu point, and nearly in the same direction, but 5 miles off-shore, several canoes were fishing in the depth of 20 fathoms, on a still larger patch of foul ground.

Information likewise was obtained of the existence of a third shoal of 7 fathoms, lying in the stream of 19 fathoms, but the surveying boats failed in finding it.

Pashu rock, with two rocky heads above water, lies in the stream of 9 fathoms, and bears S. by W., distant $1\frac{1}{2}$ miles from the mouth of Feruwa river.

Coast.—From Katu point to Subbu point, a distance of 3 miles, the coast forms four sandy bays with rocky points, and is fringed by many large rocks above water and breakers, inside of which there is a boat channel. The native towns of Pickaninny Sesters and Wayako are situated

on this coast, and there is an American Mission house on a small hill on Subbu point.

Pickaninny Sesters may be recognised by three small hills, situated 4 miles east of the town.

Rocks.—In front of Wayako, at nearly a mile from the shore and two-thirds of a mile E.S.E. of Pashu rock, there is a shoal of 3 fathoms, with deep water on either side of it.

Subbu rock, large and black, lies N.W. by W., distant two-thirds of a mile from Subbu point.

A sunken danger lies between Subbu rock and the shore.

A dangerous rock, with depths of 10 fathoms round it, is situated S.W. by W. $\frac{1}{2}$ W., distant one mile from Subbu point; and two shoals, with $2\frac{1}{2}$ and 3 fathoms water over them, lie S.S.W. from the same point, distant one-third and two-thirds of a mile respectively.

Sesters point.—From Subbu point, a low sandy beach, clear of rocks, extends $1\frac{1}{2}$ miles to the south-eastward, and then turns more to the southward towards Sesters point, off which are numerous shoals and rocks.

Carpenter rock.—This large rock bears S. $\frac{3}{4}$ E., distant one mile from Sesters point; from the rock the highest part of Sesters hill bears N. by E. $\frac{3}{4}$ E. It may be safely approached from the southward, but a long chain of rocks, above and under water, extends from it towards Sesters point, round which there is a very narrow 4-fathoms channel.

Sunken rock.—A sunken rock is reported as lying off Grand Sesters, with Carpenter rock bearing about N.E. by E. distant one mile. The S.S. *Benin*, belonging to the African Steamship Co., drawing $20\frac{1}{2}$ feet water, is stated to have touched lightly on this rock on 6th September, 1888, when there was a heavy sea.

Grand Sesters river.—Sesters hill rises 210 feet above high water behind Sesters point, but between the hill and the point there is a narrow lagoon close inside the beach, nearly 3 miles in length, into which Grand Sesters river pours that portion of its waters which cannot find sufficient vent over the bar. The mouth of this river is about a mile eastward of Sesters point; its western entrance point is low and sandy, while the eastern point is rocky, with a ledge extending from it almost across to the opposite shore, so as to leave a very narrow entrance, through which boats can pass only when the water is tolerably smooth.

Factory island.—On a rising ground near the eastern entrance point of Grand Sesters river, stands the large native town of Grand Sesters, and two English factories, in front of which a large rock, named Factory

island, sufficiently breaks the swell to allow boats to run upon the beach with tolerable security.

Anchorage.—Vessels generally anchor in 13 or 14 fathoms water, over a muddy bottom, with Factory island bearing N.N.E. about a mile distant. It is necessary to ascertain that the bottom is not rocky before letting go the anchor.

Ranger point, with a large native village on it, situated 2 miles eastward of Factory island, is rocky, but the intermediate coast is a sandy beach with a few detached rocks off it, and a boat channel of 2 fathoms inside them. Some rocks lie off Ranger point, extending to a distance of nearly 2 cables. At a mile N.E. by E. from Ranger point, the land rises into a kind of table-shaped hill, named Table tree, densely wooded, the tops of the trees attaining an elevation of 193 feet; and on the same line of bearing, 2 miles farther inland, there are two little hummocks which are named the Paps.

Coast.—From Ranger point for a distance of 8 miles to the eastward, the coast is low and thickly wooded, with a clean sandy beach, free from off-lying rocks so far as a small river, which, at the time of the survey, was open, though the surf on the bar did not permit the surveying boats to enter. Both points of the entrance are low and sandy, and there is a village on the eastern point.

This river comes from the northward, with a small branch from the westward. N.N.E. from its mouth, and 15 miles inland, there is a hill 736 feet above high water, which from its shape is named the Sugar-loaf; several small hillocks lie between it and the shore. There is also a remarkable grove of trees situated $1\frac{1}{2}$ miles east of the eastern entrance point, so that this part of the coast is easily recognised.

Garraway river.—An uninterrupted sandy beach extends 7 miles from this small river to Garraway or Tryh river, the northern side of the entrance to which is formed by a long low spit of sand, on which are situated two native villages known as Bushman town.*

Garraway river is accessible at all times to canoes, and to ordinary boats in moderate weather; the usual channel into it lies between the spit extending from the north entrance point, and a large rock above water near the middle of the entrance, which is connected with Garraway point (the south entrance point), by a chain of smaller rocks; in the middle of this channel there is a sunken rock.

Bushman reef.—In front of Bushman town, a shallow reef extends off shore for a distance of half a mile. Two shoal rocks lie W.N.W. of

See chart No. 1,365.

* See Admiralty chart : Garraway point to Growa point including cape Palmas, No. 1,697; scale, $m = 0.9$ inch.

this reef, one distant half a mile, and the other a mile from it; the latter is three-quarters of a mile from the shore, and there is a depth of 6 fathoms in the channel between the eastern rock and Bushman reef.

Garraway point, on the southern side of the entrance, is rocky, with large rocks, some above and others under water, extending south and west from it.

Rocks.—South-west of the rocks extending from Garraway point, with a narrow channel of deep water between, there is an irregular-shaped reef of considerable extent named Long patch, its north-west and south-east extremes bearing from Garraway point W. by N. and S. $\frac{1}{2}$ W., and its southern angle bearing S.W. by S. a mile distant.

Another reef, of an oval shape, named Tryh rocks, lies immediately westward of Garraway point; there is a channel into the river both east and west of it. Solitary rock lies in the stream of 9 fathoms, bearing from Garraway point W. $\frac{3}{4}$ N., distant $1\frac{1}{2}$ miles.

In 1888 the German steam-vessel *Carl Woermann* reported a shoal, southward of Garraway point to be 7 cables in extent, in a N.W. and S.E. direction with depths of 16 to 36 feet on it; the least water is near the south-eastern extreme, from which Green islet bears N. by E., distant $1\frac{1}{2}$ miles; from the north-western extreme of the shoal that islet bears about N.E.

Garraway tree.—There is a remarkable tree behind Garraway town, the top of which is 199 feet above high water; it lies E. by N. $\frac{1}{2}$ N., distant three-quarters of a mile from the point, and is used as one of the objects to distinguish the position of Coley rock, which lies 7 miles in the offing. In the direction of the tree from Garraway point, but nearly a mile farther inland, there is also a conspicuous clump of trees.

Green islet, the eastern extremity of which is high, lies a mile south-east of Garraway point, and is situated in the middle of a large breaking shoal, between which, and some sunken rocks near the beach, boats may pass in $2\frac{1}{2}$ fathoms water.

Jida river.—From Garraway point the distance is 8 miles, in a S.E. $\frac{3}{4}$ S. direction, to Fishtown point, the coast between forming a bay with a sandy beach. In this space are the entrances to three small streams; Jida river, which is the westernmost, is closely barred by sand during the dry season, and at a mile westward of the entrance there is a rocky danger a quarter of a mile off shore, with a 4-fathoms channel inside it, and 7 fathoms close to seaward. The Jida, which flows from the north-east, appeared to communicate with Garraway river by a narrow lagoon, parallel to the coast. The town of New Garraway is built on the eastern side of the entrance.

Dia river, a small stream, the entrance to which is open, and sometimes passable for boats, lies $3\frac{1}{2}$ miles south-east of the entrance to Jida river. From the mouth of Dia river, a long reef on which the sea breaks with violence, extends W. $\frac{3}{4}$ N. for distance of $2\frac{1}{3}$ miles; on its outer extreme there is a very shoal head, close westward of which there are 8 fathoms, and on either side, north or south of the reef, 6 fathoms water.

Mano river, in the bight of the bay, $1\frac{1}{4}$ miles south-east of Dia river entrance, is also open, but seldom accessible, from the high surf that rolls in along Fishtown point. About midway between Dia and Mano rivers a reef, which is "steep-to," extends more than half a mile from the beach. A little rocky islet is situated close south-west of the mouth of Mano river.

Fishtown point is about 40 feet above high water; there is a large native town of the same name, and near it a factory for collecting rice, which abounds here. On the bearing of E. $\frac{1}{4}$ N. from the point, distant $3\frac{3}{4}$ miles, is situated the Table hill of Kabla, on the northern part of which there is a grove of trees, which stands 290 feet above high water, and is a valuable mark for clearing the several dangers lying south-westward of cape Palmas.

Fishtown reef projects two-thirds of a mile in a westerly direction from Fishtown point, with a depth of 7 fathoms close round it; a detached breaker, with deep water close to it, lies one mile, N.W. $\frac{1}{4}$ W., from the point.

Cape shoal.—South-west of these breakers, at the distance of $2\frac{1}{3}$ miles S.W. by W. $\frac{1}{4}$ W. from Fishtown point, is situated Cape shoal, a ledge of rocks always visible, the sea generally breaking on them with great violence, and sometimes also on two shoal heads a little to the eastward of the main shoal. The channel between Fishtown reef and these rocks is rather more than a mile wide, and the depths in it vary from $5\frac{1}{2}$ to 8 fathoms, over a bottom of coarse brown sand, with several rocky patches.

Coley rock, lying West, distant $2\frac{4}{10}$ miles from Cape shoal, is a sharp pinnacle on which the least water is 6 feet, with depths of 10 fathoms to the eastward, and 13 fathoms close to its other sides. From this very dangerous rock the remarkable tree at Garraway bears N. $\frac{1}{4}$ E. distant $7\frac{3}{4}$ miles; Kabla hill, E. $\frac{7}{8}$ N.; Rocktown point, E. by S.; and cape Palmas, E.S.E., distant $9\frac{3}{4}$ miles.

The ground between Coley rock and Cape shoal is very uneven, having several rocky heads with 4 to 5 or 6 fathoms over, and deeper water close around, them; two other shoal spots are situated west of Coley rock,

one of $6\frac{1}{2}$ fathoms at 3 cables distant, bearing W. by N. from the rock, and another of $5\frac{1}{2}$ fathoms, known as Outer patch, W. $\frac{1}{8}$ S. $1\frac{3}{4}$ miles.

Current.—The current sets over Coley rock and in the vicinity with great strength, causing this rock and the adjacent shoals to be dangerous of approach in thick weather.

Directions.—The quality of the bottom in the vicinity of these shoals is as variable as the depth, being of rock, coarse sand, gravel and coral. Vessels bound to cape Palmas, with a leading wind, may safely pass inside Cape shoal, which is always distinguishable by its breakers; and by keeping nearly in mid-channel between it and Fishtown reef, there will be 7 fathoms water; at night it is advisable to pass outside of all, in depths of from 25 to 30 fathoms.

Middle point.—At Middle point, $1\frac{3}{4}$ miles eastward of Fishtown, there is a rivulet and native town; a reef projects about a quarter of a mile W.S.W. from the point.

Rocktown point, 54 feet above high water, is situated $1\frac{1}{2}$ miles south of Middle point and makes very distinctly to vessels in the offing; here there is a large native settlement on each side of a small river, which is quite barred in the dry season. A succession of reefs extends from the point, nearly a mile in a westerly direction, but inside them there is a narrow channel with $3\frac{1}{2}$ fathoms water.

Two single palm trees are situated close to the beach, distant respectively $1\frac{3}{4}$ and 2 miles from Rocktown point.

Coast.—From Rocktown point a sandy beach of about 4 miles in length, and but little curved, extends to Palmas river. In this space there are two reefs which show themselves by heavy breakers. The outer is situated S.S.E. $\frac{1}{2}$ E., distant one mile from Rocktown point, and rather more than half a mile off shore; the other reef is not quite a quarter of a mile off shore, and lies $1\frac{1}{3}$ miles eastward of Rocktown point, with a narrow channel having $3\frac{1}{2}$ fathoms water inside it; between the two reefs there is a depth of $5\frac{1}{4}$ fathoms.

CAPE PALMAS is a rocky peninsula, joined to the mainland by a low sandy isthmus; the highest part of the cape, near the middle, is elevated 74 feet above high water. Its eastern extremity is covered by a number of native houses named Grand town, and on the remainder of the peninsula a settlement named Harper, was formed by the Colonization Society of Maryland in 1835. The white houses at Harper are conspicuous when seen from the eastward.*

See chart No. 1,697.

* See plan of cape Palmas; scale, $m = 3.95$ inches, on Admiralty chart, No. 1,697.

The cape should be approached with caution, as a mirage generally hangs about, and over, the land, making bearings of definite objects difficult to obtain.

Palmas river falls into the sea on the northern side of the peninsula of cape Palmas; its entrance is about 100 yards wide, but several rocks lie in the channel. At low water, a general depth of 3 feet was found on the bar, inside of which, so far as the surveying boats went, the depth seldom exceeded one fathom.

The rollers on the bar are occasionally sufficiently heavy to prevent communication by ordinary boats.

Cape Palmas rocks.—In the direction of the length of the peninsula there are three groups of rocks lying off cape Palmas; the eastern of these, situated one cable from the cape, has 10 feet on it at low water; the middle rock is partially uncovered at low water, and lies 2 cables from the cape; and Outer rock, which is very small, and has a depth of 9 feet over it, lies about $5\frac{1}{4}$ cables, W. $\frac{1}{4}$ N., of the extremity of the cape.

The soundings in the vicinity of these rocks are irregular, and the bottom foul; but on either side of the inner rock there are channels with 3 fathoms water; between the large middle rock and Outer rock there is a wide opening in which there is a depth of $4\frac{1}{4}$ fathoms. Strangers, however, should not use these passes, even when coming from the eastward and bound to Harper anchorage, but should keep outside all in not less than 14 fathoms water.

Yoruba rock, with $1\frac{3}{4}$ fathoms water, on which the steam-vessel *Yoruba* struck in 1873, is situated N.W. by W. $\frac{3}{8}$ W., distant 4 cables from cape Palmas.

The wreck of the steam-vessel *Yoruba* (on the beach) bearing N. $\frac{5}{8}$ E., distant 7 cables from cape Palmas; in 1887, was still in existence and formed a good mark.

Congo rock, of small extent and pyramidal in shape, has a depth of $3\frac{1}{2}$ fathoms on it, with 5 fathoms water close around, and 7 fathoms a quarter of a cable off. It is situated with cape Palmas bearing S.E. by E. $\frac{3}{4}$ E., distant $1\frac{1}{10}$ miles.*

It is probable that this rock is that reported by the African Steam Navigation Company's vessels *Congo* in 1875, and *Volta* in 1879; and which was searched for unsuccessfully by H.M.S. *Firefly* in 1879, though it lies further to the northward than the position given by either of those vessels.

See chart No. 1,697.

* A buoy, painted red and surmounted by an iron cross, was placed near this rock in 1898, but being only moored with a boat's anchor no dependence should be placed on finding it in position.

Anchorage.—The usual anchorage is on the west side of cape Palmas, in 6 or 7 fathoms water, on a line between Rocktown point and the cape with the latter bearing S.E., distant $5\frac{1}{2}$ cables, or farther out with the cape bearing about E.S.E., but clear of Yoruba rock. Steam-vessels sometimes anchor nearer the cape in 5 fathoms, but have been obliged to shift out, on rollers setting in.

Russwurm island, on the south side of cape Palmas, is small, rocky, and nearly covered with grass and shrubs; it was so named after the first governor of the American colony of Harper, and was formerly used by the natives as a depository for their dead. The island is nearly 3 cables in length, with an average breadth of about half a cable, and a rocky pinnacle on it rises 43 feet above high water. A ledge of rock extends about a cable from its eastern extreme, and terminates in a large rock above water; at half a mile eastward of the island, and nearly a quarter of a mile from the shore, there are some breakers with $4\frac{1}{2}$ fathoms water close to their south side.

Three Feet rock, $1\frac{2}{3}$ cables W. $\frac{1}{4}$ S. from the western extremity of Russwurm island, has 3 feet water on it, and is dangerous.

Boat passage.—The channel which separates Russwurm island from cape Palmas affords a good passage to boats, provided they keep on the northern side of it.

Flat mountain.—North-east of cape Palmas there is some elevated land, the highest part of which is named the Flat mountain; it bears N. by E. $\frac{1}{2}$ E., distant 25 miles from the cape, and is 1,095 feet above high water.

Depths off shore.—The 100-fathoms edge of the bank of soundings approaches cape Palmas within 13 miles, the depth decreasing to 30 fathoms at a distance of 6 miles from the shore; and at $1\frac{1}{2}$ miles from the cape the depth is 15 fathoms.

The bank of soundings, under 10 fathoms, south-west and westward of Yoruba and Outer rocks off cape Palmas, was closely searched, for reported dangers, by the boats of H.M.S. *Firefly*, 1879, but without success.

Tides.—It is high water, full and change, at cape Palmas at 4 h. 30 m.; springs rise 4 feet.

See chart No. 1,697.

CHAPTER XI.

CAPE PALMAS TO CAPE THREE POINTS.

IVORY COAST.

 VARIATION in 1900.

Grand Bassam	-	-	18° W.
Cape Three Points	-	-	17° 40'.
Decreasing about 2' annually.			

LAGOON.—A narrow stagnant lagoon, extends for 6 miles to the eastward of cape Palmas. It appears to be supplied by a small river, which, except in the rainy season, has not power to break through the sandy barrier that separates it from the sea. The position of this occasional outlet is marked by a depression of the beach and on each side of it there is a native village, the inhabitants of which, it is said, sometimes empty the lagoon by an artificial channel, in order to take the fish.*

Athol rock.—The beach eastward of cape Palmas is “steep-to,” with one or two conspicuous masses of stone upon it. A rock, with 3 fathoms water over it, bears S.E. $\frac{3}{8}$ E. distant $1\frac{8}{10}$ miles from the cape. In the same direction, but one mile farther off, there is a rock with a depth of 5 fathoms on it; and S.E. $\frac{1}{8}$ S. distant $4\frac{1}{2}$ miles from the cape, is Athol rock, with $3\frac{1}{4}$ fathoms water over it, lying in the stream of 12 fathoms, and so named from H.M.S. *Athol* striking on it in 1830; its distance from the nearest shore is $1\frac{3}{4}$ miles, with cape Palmas bearing N.W. $\frac{1}{8}$ N., and Growa point bearing E. $\frac{1}{8}$ S. The sea is said not to break on Athol rock, even with a heavy swell.

Growa reefs.—The space between cape Palmas and Growa point, a distance of 7 miles in a S.E. by E. $\frac{1}{2}$ E. direction, is full of rocky heads, of too great a depth to bring a vessel up, except the three above described but a long series of reefs, “steep-to,” and on which the sea breaks violently extend nearly 2 miles west from Growa point, and no vessel should approach them at night in a less depth than 15 fathoms; there are two native villages near the point.

From about one-third of a mile east of Growa point a reef extends for three-quarters of a mile to the south-west, and terminates in a rock above

* See Admiralty charts :—Garraway point to Growa point, including cape Palmas No. 1,697; scale, $m=0\cdot9$ of an inch; Baffu bay to Grand Berebi, including cape Palmas, No. 1,365; scale $m=0\cdot25$ of an inch; also, Grand Berebi to cape Three points, No. 1,362; scale $m=0\cdot25$ of an inch.

water. Nearly a mile westward of Growa point a large square-shaped, stone house, painted white, standing on a hill, is a most conspicuous mark, and here there is a trader's house on a cliff at the water's edge.*

CAVALLY POINT, $1\frac{1}{4}$ miles eastward of Growa, and the southern extremity of this part of Africa, may be distinguished from the adjacent sandy shore, by its black, rocky appearance; it is surrounded by reefs, extending 6 cables to seaward; the village of Half Cavally stands on the point, and here there is a square church tower, once conspicuous, but now of a dark colour and somewhat obscured by trees; there is, however, a white house on the point which may be seen from a considerable distance, and three factories, also white, stand on the east side of the point; there are three other villages to the eastward.

Communication.—The African-mail steamers call here fairly regularly, when they have cargo to land, and they usually pass within signalling distance.

Supplies.—There are two trading firms here, and small bullocks, sheep, goats, and a few poultry may be procured, but, as a rule, supplies are poor.

Cavally rock.—Eastward from Cavally point, distant $1\frac{3}{4}$ miles, there is a large rock above water, which rises from a reef lying about a quarter of a mile from the beach; and at a half a mile farther east is the commencement of a ledge of rocks fringing the shore for a distance of $1\frac{1}{2}$ miles, and extending generally throughout its length for a distance of one-third of a mile from the beach. Sunken reefs lie close along the coast abreast of this ledge, and between them there is a narrow channel, in which there is a depth of $5\frac{1}{2}$ fathoms.

Cavally ledge.—Between Cavally point and Cavally river there is a large and dangerous ledge, about a mile in length, in an east and west direction, the southern extreme of which rises suddenly from a depth of 10 fathoms, and extends from thence towards the river. From the west extreme Cavally point bears N.W. by W. $\frac{3}{4}$ W., distant nearly 3 miles, from the east extreme the mouth of Cavally river bears E.N.E., distant about half a mile.

Cavally river, which is said to be navigable for small steam vessels for about 50 miles at high, and 43 miles at low, river, issues between two low and sandy points, $4\frac{1}{4}$ miles eastward of Cavally point, the entrance is about half a cable in width, but within, the river widens to the breadth of a mile, and here there are three islands covered with rice plantations. On the western entrance point there is the village of Kablaké, and two white factories with grey roofs and several large trees, but in 1892 they were abandoned, and not easily made out from seaward; on the eastern

* See plan of Cavally anchorage, scale, $m=1\cdot5$ inches on Admiralty chart, No. 1,365.

entrance point there is a group of tall palm trees, and here is the village of Bliéron, and a custom house.

At a short distance seaward of the bar, there are some detached rocks, with $4\frac{1}{2}$ fathoms water close to the southward. Discoloured water extends from 2 to 3 miles from the mouth of the river.*

Boundary.—Cavally river is the boundary between Liberia and the French colony of Kong.

Landing.—The signal for a boat, and the time it is required, to the trader's house on Cavally point, will generally bring a surf boat to the outer entrance between the reefs, where it can be met by a boat from the ship; landing in a ship's boat might with difficulty be effected, but leaving the beach again would be almost impossible. When the bar is bad there is a landing place about $1\frac{1}{2}$ miles east of the entrance, at a factory near fort Verdier.

Anchorage.—There is anchorage on a rocky bottom in 7 fathoms water, midway between Cavally point and Cavally ledge.

Owing to the rocky nature of the bottom, vessels are recommended not to anchor off this part of the coast in less than 10 or 11 fathoms water.

Yubua rocks.—At about 3 miles eastward of Cavally river there is a small rocky islet situated half a mile off shore, with a long reef extending from it in a W.S.W. direction; from the west extreme of this reef to the beach, the space is filled with a succession of breakers and ledges of rocks.

Coast.—From Yubua rocks to Tafu point, the coast trends $8\frac{1}{2}$ miles in an easterly direction, the shore being formed by a sandy beach, off which lie a few rocks, and along which are several villages, conveying the idea of there being a numerous population. South of the village of Biahuin a rock, with less than 6 feet water over it, lies nearly three quarters of a mile off shore. The interior appears to be one dense continuous forest, rising occasionally into clumps, either from undulations in the ground or from the character of the trees. Some of these clumps attain the height of nearly 200 feet above high water.

TAFU POINT, $8\frac{1}{2}$ miles east of Yubua rocks, is a small bold cliff with a depth of 3 fathoms close to its base. There is a large two-storied factory with a red roof on the point.†

Tabu river is small, but expands into a lagoon, before issuing, at $1\frac{1}{4}$ cables north-east of Tafu point, through a narrow channel, not more than a quarter of a cable in breadth. Between Willson point, the west entrance point, and Tafu point, a reef of sand and rocks, some of which are dry,

* It is stated that there is always a passage by which a small steam vessel could enter the river, but, as the channel is continually shifting, it should be buoyed before entering. The French gunboat *La Topaze*, in January 1897, entered the river, and ascended it for a distance of about 44 miles; the river is navigable, at all times, for canoes for a distance of 50 miles to the rapids of Gré.

† See plan. Tabu river, scale, $m = 0.75$ of an inch on Admiralty chart, No. 1,365.

extends to the south-eastward; on the bar between this reef and William point, the east entrance point of Tabu river, there is a depth of 3 feet at low water. The river is navigable for canoes, during the season of low river, so far as the first rapid, about $9\frac{1}{2}$ miles from the mouth, but there is very little commerce.

The shallow channel lies along the eastern shore, till a spit of sand, which projects from Willson point, and is nearly awash, is rounded, and even then the water scarcely deepens for a mile within the entrance; nevertheless, this little river is a convenient place for wooding and watering, being easy of access to ordinary boats, when the bar is smooth, and there is good anchorage in 7 fathoms within a quarter of a mile of its mouth.

H.M.S. *Wrangler* anchored off Tabu river from the 7th to 9th October 1885, during which period the bar was impracticable for ships' boats, and during the rainy season it is frequently impassable for surf boats.

It is stated that the bar is worst at full and change of moon, but can generally be crossed in a surf boat.

Communication.—The African mail steamers call here, when they have cargo for the place, and pass within signal distance.

Supplies.—The consent of the neighbouring chiefs (who style themselves respectively the River King and the Hill King) to obtain wood is necessary. The former possesses the large village of Kablaké on the east side of the entrance of the river; while the dominion of the latter is confined to a village, which stands on a rising ground about half a mile farther to the eastward, and is well stockaded. There are two English, one French, and two native factories, and here is a French military post; one of the factories is painted white, with a red roof.

Some small cattle, sheep, goats, and fowls, with bananas, sweet potatoes, cassada, pumpkins, and rice may be procured. Coloured cloth and most manufactured articles fetch their full value all along this coast, but above all other things, rifles and powder are the great objects for which they contend.

Water.—At the last of the ebb tide, good fresh water may be obtained in any part of Tabu river; but it is more prudent to procure it about half a mile within the entrance, abreast of a small detached sand-bank, where the boats may anchor in the middle of stream, and fill their casks alongside.

Rocks.—Some rocks above water and sunken dangers lie eastward of William point, and also off James point the next to the eastward. Off the Hill King's village there is also a small reef; all these dangers have $2\frac{1}{2}$ fathoms close to their southern edges. The most dangerous of them lies a third of a mile, S. $\frac{1}{2}$ E., from the Hill King's village; it has 3 feet water over it, with a depth of 3 fathoms close around it.*

* See plan. Tabu to Wappu, scale $m = 0.9$ inch; on Admiralty chart, No. 1,365.

Tides.—It is high water, full and change, in Tabu river at 4 h. 45 m. ; spring rise from 3 to 4 feet.

TABU POINT.—From Tafu point the coast trends about E. by N. for a distance of nearly 3 miles to Tabu point, that is low and foul ; and S. $\frac{1}{2}$ W. from which, at three-quarters of a mile distance, there is a rock with $2\frac{1}{2}$ fathoms water on it, “steep-to” with a depth of 9 fathoms outside it. Tabu point is double, with a village on each of its projections, and close round it to the northward, is a barred river, but open probably during the rainy season.

Grand Tabu.—At one mile north-east of Tabu point there is a large native village named Grand Tabu, with an isolated reef in front of it, situated about a quarter of a mile from the shore.

Anchorage.—Vessels anchor off Grand Tabu for trading purposes ; the natives are treacherous and should be guarded against.

The French war vessel *Pourvoyeur* anchored at half a mile S.W. $\frac{1}{4}$ S. from Tabu point in $13\frac{1}{2}$ fathoms water, over black mud ; in a less depth the bottom is bad.

BASHA POINT.—The bight between Tabu and Basha points, except at the above-mentioned reef, is clean, with regular soundings, and a sandy beach ; Basha point is capped with rock, which, seen from the west, resembles the outline of a fort ; a reef extends nearly a mile from the point, and the town upon the point stands 50 feet above high water.

The town of Grand Basha may be known by a long, low house with a grey roof, and also by a grove, which stands about 344 feet above high water, on a rising ground N. by E. $\frac{1}{2}$ E., distant 5 miles from the point.

Du Enun hill, 15 miles distant in nearly the same direction, is likewise a conspicuous object.

A chain of reefs commences at half a mile westward of the point, and continues for a distance of $1\frac{3}{4}$ miles to the north-eastward. They extend more than half a mile off shore, and lie in detached groups, “steep-to” on the outside, with a boat channel between them and the beach ; this part of the coast should be approached with great care, for in 1853 H.M.S. *Penelope* struck when 2 miles off shore, with Basha point bearing W. by N., distant 2 miles.

Grand Basha river, at about a mile north-east of Basha point, like most of the rivers on this part of the coast, forms a junction with another stream just at the shore ; there is a bar before it, and also two reefs a short distance outside the bar, with a narrow boat channel between them.

Wappu point.—From Grand Basha river a broad and nearly straight beach extends $3\frac{1}{2}$ miles to Wappu point, a small rocky cliff on which a native town stands about 60 or 70 feet above high water ; it is quite

safe to approach and bold on its southern face; but to the eastward there are some off-lying rocks along the shore for the distance of a mile, none of which extend more than $1\frac{1}{2}$ cables from the coast. At Wappu there is a large tree, and at a distance of one mile N. $\frac{3}{4}$ W. from the tree a grove, the top of which is about 344 feet above high water.

There is no permanent opening through the beach at Wappu, but a large body of water that accumulates there, sometimes issues just to the westward of the cliff. This water is connected with a long and narrow lagoon, which lies close behind the beach, and reaches to the small river near Poor point, a distance of 9 miles. The sandy barrier that separates this lagoon from the sea is covered with trees, but occasional bare spots show where the swelling waters burst through in the rainy season.

POOR POINT, situated on the western side of a small river, is low and rocky, and some rocks extend from it to the eastward about a quarter of a mile, in front of the entrance to the river, which is very narrow, but not entirely closed. These rocks, many of which are above water, are "steep-to," having a depth of 4 fathoms close to them to seaward.*

Half Berebi.—The native town of Half Berebi stands upon the second point east of Poor point; the numerous villages near the shore appear to be thickly peopled, but traders should guard against the treachery of the natives.

Coast.—From Poor point to the rocky bluff of Kadabu, the distance is 10 miles in an E. by N. $\frac{3}{4}$ N. direction. The coast between consists of a succession of sandy bights divided by rocky points, and the whole country appears a vast forest, rising gradually into dark wooded hills, one of which, named Berebi coppice, lying N. E. by N., distant $2\frac{1}{2}$ miles from Poor point, is 297 feet above high water.

Round mountain, bearing N. by W. $\frac{1}{4}$ W., distant $11\frac{1}{2}$ miles from Poor point, and Long mountain, bearing N. $\frac{1}{4}$ E., distant 8 miles from the same point, are of moderate elevation, but afford good landmarks when in the offing.

At 3 miles east from Poor point, commences an extensive line of reefs lying parallel to the coast for a distance of $4\frac{1}{2}$ miles, and terminating rather more than half a mile south-west of Devil rock. The average breadth of this chain of reefs is about a mile, and there is a safe passage for boats between it and the shore, with regular soundings of from $1\frac{1}{2}$ to $4\frac{1}{2}$ fathoms. This whole chain is "steep-to" on the outer side, there being 6 fathoms water within a few yards of it, and farther out there are no dangers, the soundings decreasing regularly from a depth of 30 fathoms which is found at 5 miles in the offing.

Devil rock, large and oval-shaped, is 45 feet above high water; the base is dark, but the numerous sea-fowl, of which it is the constant

* See plan Poor point to Katun rock; scale $m=0.9$ of an inch, on Admiralty chart, No. 1,365.

resort, have blanched its flat summit. It lies about $2\frac{1}{4}$ miles, W.S.W., of Kadabu bluff, and two-thirds of a mile from the nearest shore. On the bearing of E. by N. $\frac{1}{2}$ N. from it, distant a third of a mile, there is a sunken rock, upon which the sea breaks. These rocks are both "steep-to" on the south side, having 6 fathoms water close to them, and there is a channel, of from 4 to $5\frac{1}{2}$ fathoms in depth, between them and the shore. The depths between Devil rock and Rocktown point, W.N.W. from it, range from $4\frac{1}{2}$ to $5\frac{1}{4}$ fathoms over a sandy bottom.

Rocks.—In the approach to Rocktown, the French S.S. *Pelion*, 1899, struck on a rock from which Devil rock bore N.N.E. $\frac{1}{2}$ E., distant $3\frac{3}{4}$ cables, and Rocktown point N.W. $\frac{3}{8}$ W., but neither the vessel's draught of water, nor the soundings obtained at the time, were communicated.

The two following rocks have also been reported :—Point Rocher, from which Devil rock bears S.E. $\frac{5}{8}$ E., distant 7 cables, and Rocktown point S.W. $\frac{5}{8}$ W. Rocherplat, from which Devil rock bears E. by N. $\frac{1}{4}$ N., distant $8\frac{1}{2}$ cables, and Rocktown point N. by E. $\frac{1}{2}$ E.

KADABU BLUFF is a bold rocky point, the south-east extreme of which is cleared of trees, and the bare summit, on which stands the native town of Yeh, is 120 feet above the level of the sea.

Grand Berebi.—From Kadabu bluff, the shore, bordered with large trees, makes a sudden turn to the northward, for about a mile, to the mouth of Nano river; and on a rising ground nearly midway between stands Grand Berebi town, the huts of which are cylindrical with conical roofs, and here there are three conspicuous high-topped trees above the bush. Abreast of the town, and a quarter of a mile off-shore, there are some rocks named Gumara reefs, with a boat channel between them and the beach.

Nano river also known as the Berebi and the Poor, has a lagoon at its mouth and discharges a small volume of water, but its sheltered position enables it to wash away the bar at its entrance, so as to be always open for boats; there are some rocks immediately off its mouth, with a depth of 2 fathoms inside them. The village of Nano is situated at the side of the lagoon, and east of this are the villages of Tobé and Bassa.

There are several hills by which this place may be recognised from the offing; two standing together, named the Sisters, 315 feet high, lie 3 miles N.W. of Kadabu bluff; Akol, a sharp-pointed hill, is situated N.N.E., distant 5 miles from the bluff; and, at a distance of 16 miles in the same direction the Oval mountains rise 1,315 feet above high water.

When near the shore the place may be known by the sudden receding of the coast line and the peculiar form of Kadabu bluff, as well as by Katum rock, a block of granite, 36 feet in height, showing white, and lying $1\frac{1}{4}$ miles, N.E. by E. $\frac{1}{4}$ E., from Kadabu bluff. At one cable west of Katum rock, there is a depth of 6 feet.

Communication.—The steamers of the Frassinot Company pass monthly, and those of the Compagnie de Chargeurs Réunie call at uncertain dates to ship and discharge crews of surf boats.

Supplies.—Bullocks, goats, poultry, eggs, tapioca and oranges may be obtained.

Landing may be effected in a cove where there is a beach, but the entrance to the river is not always practicable for ships' boats, and the tidal streams run very strongly.

Anchorage may be taken up north of Katum rock, midway between it and the shore in from 23 to 26 feet water, over sand and sheltered from the swell; west of Katum rock in a depth of 5 fathoms, over fine sand, with little swell; or in 7 fathoms water, south of Katum rock, with good holding ground, but at a distance for communication; the anchorages are frequented by trading vessels, who here embark Krumen.

Tides.—Spring tides rise $5\frac{1}{4}$ feet.

COAST.—From Grand Berebi a long sandy beach, rocky and "steep-to" in places, with 4 fathoms water close to it, trends about E. by S. 13 miles to Tahu point; the numerous native settlements along this part of the shore are named generally the Villages of Tahu. The coast is thickly wooded and of moderate elevation, the tops of the highest trees near Tahu point being 290 feet above high water.*

Tahu point, low and covered with forest trees, has the two villages of Bassa and Domba near the shore; they consist of round huts with conical roofs, and between them the King's house, a low whitewashed building, with a flagstaff, is a conspicuous object from a distance.

Eastward of Tahu point the shore changes its character, isolated and irregular hills rising immediately over the beach.

Supplies.—Eggs, tapioca, and cocoanuts, may be procured from the villages near Tahu point.

Rocks.—In this extent of coast there are many rocks, both above and under water; the first group, situated $1\frac{1}{2}$ miles eastward of the large white rock of Katum, is about two miles in length, and extends three-quarters of a mile from the shore.

Bruni rock, or Whiteman, $4\frac{3}{4}$ miles, E. by S. $\frac{1}{2}$ S., from Katum rock and $1\frac{1}{4}$ miles from the shore, is a large white rock, 33 feet above high water, with depths of 9 fathoms round it.

Naufona reef which shows at low water and breaks, lies nearly a mile W. $\frac{1}{2}$ S. from Bruni rock, in the stream of 10 fathoms; and abreast of it,

See chart No. 1,365.

* See Admiralty chart:—Grand Berebi to Cape Three Points, No. 1,362; scale, $m = 0.25$ of an inch.

near the shore, there is a group of rocks above water, with a channel of $3\frac{1}{2}$ fathoms between them and the beach.

White rock, a rocky ledge, with $5\frac{1}{2}$ fathoms water on it, lies E. $\frac{1}{2}$ S., distant $1\frac{3}{4}$ miles from Bruni rock, in the stream of 10 fathoms; midway between that ledge and Tahu point, and at about half a mile from the beach, there is a sunken rock, inside of which there is a channel of 5 fathoms; at a mile farther to the eastward, there is another shoal, nearly in the meridian of a high grove of trees; and just westward of Tahu point a series of rocks commences which nearly surrounds the point, and in one place the rocks extend from it nearly a mile.

Some of them are large masses of dark stone above water, and a narrow channel may be found through them with $3\frac{1}{2}$ fathoms water in it. All these rocks are "steep-to" on the southern side, and it would not be prudent to pass Tahu point at a less distance than one mile.

The Master of the French steam-vessel *Rhone* recently reported having touched on a sunken danger, supposed to be a wreck, lying about $2\frac{1}{2}$ miles south-south-westward of Tahu point.

Position, to be considered doubtful, lat. $4^{\circ} 40' N.$, long. $6^{\circ} 42' W.$

It is possible this may be the wreck of the *Soudan*, the position of which, not accurately ascertained, was placed in lat. $4^{\circ} 41\frac{3}{4}' N.$, long. $6^{\circ} 39\frac{3}{4}' W.$ Although this danger was unsuccessfully searched for by the French war vessel *Brandon*, 1895, it will be well for passing ships to give this point a wide berth.

Coast.—From Tahu point, which has a small factory just west of it, to Mohikrako point the shore is fringed by a succession of rocks and breakers; they are all "steep-to" on the outer face, do not project more than half a mile from the coast, and leave a safe 3-fathoms channel for boats between them and the beach.

About 3 miles eastward of Tahu point, the river Boba, a small muddy stream, issues from the brushwood, and in the centre of its entrance lies Bird islet, which is small and wooded; during the Admiralty survey in 1838 the entrance was entirely barred by a broad bank of sand, but inside it is said to communicate with San Pedro river by numerous channels, none of which are even practicable for canoes.

The point, on the east side of the river Boba, is surrounded by hills 350 feet above high water.

Mohikrako point, which by its shelter leaves the bar of San Pedro river generally passable, is a bold rocky peninsula, but has some rocks extending a short distance off it; it forms the south entrance point of San Pedro river. A rocky hill rises to the height of 350 feet immediately inland from the isthmus, which connects Mohikrako point to the main. A small river lies to the westward of the point.

Soudan rock.—The steam ship *Soudan* struck on a danger (and subsequently foundered) supposed to be situated about half a mile S.E. $\frac{1}{2}$ S., from San Pedro rock, 16 feet above high water; this is, in all probability, the rock shown in approximately lat. $4^{\circ} 43' 15''$ N., long. $6^{\circ} 37'$ W.

SAN PEDRO or YE RIVER is a fine open stream issuing from behind Mohikrako point, 6 miles east from Tahu point, and stretching out into a lagoon; it is extremely tortuous and encumbered with felled trees, but at the season of flood it can be ascended for three days' journey; at low river, however, it is not navigable for canoes for a distance of more than 6 miles from its mouth. West of the entrance, on a hillock, situated inside the peninsula, which the river forms upon its right bank, there is a white house, with a zinc roof which forms a good landmark. The mouth of the river is only seen from south-east, being covered by the peninsula above mentioned; here there are two factories.

There are several villages on the banks of the river, the principal being Little and Great Poro, about 3 and 4 miles respectively from the entrance, on the east and west banks.

LIGHT.—On the west side of the entrance to San Pedro or Ye river, a grey metallic tower, 16 feet in height and situated in front of, and a short distance from, the Residency, exhibits at an elevation of 160 feet above high water, a *flashing white* light, which shows a *single flash* every *five seconds*, and should be visible in clear weather, from a distance of 19 miles.

Communication.—The Colonial mail steamer calls here.

Supplies.—Bullocks may be procured; and fresh water taken from the river at about 6 miles from the entrance, but it is only suitable for washing purposes.

Depth.—The bar is practicable for whale boats and has a depth of 6 feet at low water, the channel being about 50 feet wide; at slack water, or with the first of the flood, is the best time for entering.

Tides.—It is high water, full and change, at San Pedro river at 4 h. 20 m.; springs rise about $5\frac{1}{2}$ feet; the tidal streams in the river are very rapid, and the ebb strong on the bar.

Coast.—East of the entrance to San Pedro river there is a sandy beach behind which are some hills; a small hill here has been partially cleared of timber, and in the clearing the earth shows in red patches.

Drewin or Monoho point, 65 feet high, bold, rocky, and covered with trees, lies 11 miles eastward of San Pedro river; and in the space between there are a few indentations in the coast, and but two dangers. A short reef lies about a mile westward of Ensu point, which latter is 4 miles eastward of San Pedro river; behind Ensu point is a lagoon which receives the waters of the Brimay river, the mouth of which

is closed during the dry season; it is, however, always navigable for canoes, for a distance of about 12 miles from its outlet. Bohoro rock is the western of two rocks, situated $3\frac{1}{2}$ miles eastward of Ensu point, which lie about a quarter of a mile from the coast in front of a village, with a clear 3-fathoms channel between them and the shore.

The approach from the offing is everywhere safe, with regular soundings. The land here gradually attains a little higher elevation, and is more diversified with hill and dale than the coast to the westward. The hill named East Tree is 400 feet above high water; Temple hill 517 feet; and the whole range, which extends 27 miles along the coast to Sassandra river, is known as the Highland of Drewin.

Half or Little Drewin.—On the north side of Drewin point there is a small bay, known as Victoria gulf, with the two villages of Half Drewin situated at the base of the hills; three large rocks lie east of Drewin point. The Krumen name the inhabitants “The Saucy Drewins,” from their rough and noisy habits.

Abrapa Cliffs.—From Half Drewin a succession of small rocky points, with slightly receding sandy beaches between them, extends in a straight line E. $\frac{1}{2}$ S., for a distance of 6 miles to the white cliff of Abrapa, off which there are two rocky banks, with breakers extending about $1\frac{1}{2}$ cables from them to the southward; the white cliff is not readily distinguished. In the space between, there are also three small streams, but all barred across their mouths.

Enframa point.—From Abrapa cliffs to Enframa point, a distance of 7 miles in an easterly direction, the coast continues of a similar character; several rocks show themselves by breakers, but they are generally very near the shore, and all have a depth of 6 fathoms close to. The most prominent of these lies about $2\frac{1}{2}$ miles eastward of Abrapa point, and nearly half a mile off shore, with a 4-fathoms channel between it and the coast. There is a conspicuous white cliff with some reefs at its base, nearly half-way between Abrapa and Enframa points, off which latter a reef extends about a quarter of a mile.

Kassi point lies 4 miles eastward of Enframa point; in the bay between the Kbégo and Niéga, both small rivers, have their outlets in a lagoon and are barred in the dry season; the Kbégo is navigable for canoes for about 2, and the Niéga for about 5, miles from the lagoon. At $1\frac{1}{2}$ miles eastward of Kassi point is a large village named Grand Drewin. The wood of Damadoso is a remarkable clump of tall and rounded trees, on the summit of a naked hill, between Kassi point and Grand Drewin; to the left of this clump there is an isolated palm tree, and to the right the village of Tabué built on the hill.

Coast.—From Kassi point to Swarton corner, a distance of 7 miles in an E. $\frac{1}{2}$ N. direction, the coast still retains its character of sandy bays and

rocky points, fronted by small reefs, and with elevated land in the interior intersected by valleys.

Grand Drewin.—The settlement of Grand Drewin, which is the present commercial centre between San Pedro and Sassandra, is situated 2 miles east of Damadoso wood; off the village there is a detached rock, about half a mile from the shore. Midway between this rock and Swarton corner there is a reef with two breaking shoals outside of it, lying a mile from the shore; from thence to Swarton corner the coast is clear of all danger. There are five English and three native factories at Grand Drewin.

Swarton corner is a bold headland, 220 feet above high water, covered with luxuriant vegetation, and forms the eastern extremity of the Highland of Drewin; the French Residency stands on a hill, which is connected to the land by a sandy spit, on which are several factories. Some fragments of rock are scattered round the base of Swarton corner, but there are depths of 5 fathoms close to them.

SASSANDRA or ST. ANDREW RIVER.—King George town stands on the shore about half a mile north of Swarton corner, and at the head of the little sandy bay eastward of that headland, the rivers Sassandra and Tabeta discharge their united waters into the sea.*

The Sassandra river rises in the hills of the same name, and has an average breadth of 200 yards, but in places is more than half a mile in width; it is obstructed by several rapids, with numerous islands, the mean depth of the channel being about 5 feet. The two long sandy spits, between which lies the entrance, are probably submerged during the rainy season; and then a large rock 8 feet high, which stands on the extremity of the western spit, will appear like an islet in the middle of the entrance.

The bar which extends across the entrance has not been properly sounded, but in the fine season (December to April) surf boats cross it and have found depths of 6 feet, the tidal streams run strongly and the bar is very hard. A few soundings obtained from a canoe in the lagoon, formed inside the mouth, showed that in parts of it there were depths of from 5 to 7 fathoms. Besides the rivers above mentioned, the Beyh and the Gapeh, two smaller streams, fall into the bay, and opposite the mouth of the latter there is a small island named by the natives Nuckba.

Sassandra hills.—On the bearing of N.W. by N. from Swarton corner some elevated land is 5 or 6 miles distant; and there is a

See chart No. 1,362.

* In 1895 the Sassandra river was ascended in canoes, at low river, for a distance of nearly 70 miles from the entrance to the village of Kuati; in this distance upwards of twenty-five rapids were encountered, some of which were nearly a mile in length, the general breadths of the river being from 200 yards to more than half a mile. Bulletin de la Société de Géographie, 1898.

range of still higher ground, named the hills of Sassandra, the extremes of which bear from N.N.W. $\frac{3}{4}$ W. to N. by E., distant 15 miles from Swarton corner; the highest part of the range is 930 feet above high water.

Supplies.—There are four factories; and bullocks, sheep, poultry and fruit may be procured; fresh water may be obtained, on the west bank of the river, near the factories.

Landing is easy at all seasons in surf boats, and in fine weather it may be effected on the beach near the factories; in bad weather it is also possible to land in the south-west corner of a small cove at the base of the cliff of Swarton corner, but from December to April the surf boats generally enter the river. The bar of the river is generally very regular.

Anchorage may be obtained off the river in $6\frac{1}{2}$ fathoms water, over sand, with Swarton Corner bearing W. by N. $\frac{5}{8}$ N., and the French Residency N.N.W.; here, in the event of dragging the anchor, the current of the river will set a vessel off the land.

Tides.—It is high water, full and change, at 4h. 20m.; springs rise about 5 feet.

Depths off shore.—The bank of soundings to the 100-fathoms line extends 18 miles south from Swarton corner, the 30-fathoms line approaching to within 10 miles.

PRICE or DAÉRÉBRU POINT.—Eastward of Sassandra river a flat coast and sandy beach extends for $3\frac{1}{4}$ miles to Price point, at which hills again rise, those immediately about the point attaining an elevation of 276 feet.

This sandy beach is “steep-to” and quite clear of rocks; but Price point and Ahorokoa or Trepau point, situated $1\frac{1}{4}$ miles farther east, are both rocky, and have a few off-lying rocks at their bases; there are two small bays between these points, and at the base of the hills near the shore there are numerous villages, the principal being Kadrokoa where there are two factories. The soundings decrease more slowly in approaching the shore here, than to the westward of Sassandra river, and the bottom is everywhere of mud.

Mortality or Bruko point, lying 2 miles eastward of Ahorokoa point, projects but little from the line of coast, and is bold and without any detached rocks; the vicinity is populous. The best landing, on this part of the coast, is behind a point of rocks at Yagrokoa village about a mile north-east of Mortality point; here the river Dagbé, navigable for canoes for a distance of about 7 miles, discharges into a lagoon of the same name.

Mount Langdon.—From Mortality point to Mount Langdon, a distance of $5\frac{1}{2}$ miles, the shore continues high and broken by ravines,

through which runs large streams. A few rocks lie near the shore in this space; the bank of soundings off the coast is rather flat, there being 3 fathoms water close in, and only 7 fathoms at $1\frac{1}{4}$ miles in the offing. Mount Langdon, 355 feet above high water, has a short reef extending about a quarter of a mile from its base, and on either side a barred-up river; here the beach is sandy, with occasional bare patches of rock upon it.

Yawoda cliff.—At Yawoda, situated 3 miles eastward of Mount Langdon, a series of red cliffs begins, and extends to Fresco, a distance of nearly 15 miles; the most remarkable of these is situated east of Kutru, the cliff having red cracks striped vertically with white lines. From Yawoda to the red cliff of Kutru the coast is nearly straight for a distance of 4 miles; the land continues high, much broken, and to all appearance thinly peopled. The beach is sandy and entirely clear of rocks; at Kutru the cliffs are about 150 feet above high water, while the tops of the trees on the adjacent hills rise to a height of 270 feet.

Kutru consists of eight small villages and has a custom house and two factories; here is a lagoon named Tatubo which has an opening to the sea at all seasons, but being encumbered with mud and sand banks it can only be used by small canoes which also ascend, for short distances, the two small streams that discharge into the lagoon.

Mount Bedford.—The coast continues nearly straight for 9 miles in an E. by S. direction from Kutru to Mount Bedford, which stands over the largest and most remarkable of the red cliffs, at an elevation of 238 feet above high water; the shore is generally a sandy beach, though under some of the cliffs the beach disappears, and large stones, apparently débris from the falling of the cliffs, form the coast line.

Throughout this space the shore is fronted by rocks, which extend a quarter of a mile from it; but a vessel may stand into 5-fathoms water without danger, and in that depth will generally be about half a mile from the beach.

Fresco.—The red cliff at Mount Bedford is $1\frac{1}{2}$ miles in length, and its eastern extremity descends gradually to Fresco, which is a large native town standing on a sandy point; there is a factory, painted white, just east of the red cliff, and a custom house at Fresco.

The Fresco hills, a range of high land, is situated 5 or 6 miles N.N.E. of the town.

Fresco lagoon extends 6 miles in an easterly direction from Mount Bedford to about a mile east of Fresco, where it has its outlet to the sea which is barred in the dry season. The river Bwiko, with depths of from 6 to 9 feet, is navigable for canoes for a distance of about 7 miles, and discharges into the lagoon north of Fresco; 7 miles east of this the Niuniuru or Dagir river at times discharges into the sea, but more

* See chart No. 1,362.

frequently finds a passage to the lagoon; this latter river, which is encumbered with felled trees, might, if cleared, be navigable for canoes to the first rapid, a distance of about 28 miles.

Anchorage.—Vessels usually anchor off Fresco, at distances of from 3 to 4 cables off the beach, over a bottom of sand.

Coast.—The coast between Fresco and the river of Grand Lahu, for a distance of 35 miles, in an E. by S. direction, is low, well wooded, and sparsely populated. The beach, everywhere a clean light-brown sand, free from off-lying rocks, is nearly straight, and the surf on it is always very high. Within this beach there is a narrow strip of stagnant water, which lies parallel to the coast throughout the whole distance between the two rivers, and in a few places appears to receive some small streams from the interior. Native villages, built at intervals upon the narrow belt of land between this backwater and the ocean, are generally surrounded by groves of cocoa-nut trees.

Depths off shore.—The soundings along this whole extent of coast are regular, there being a depth of 3 fathoms close outside the surf, deepening gradually to 10 fathoms at a mile from the beach. Near the coast the bottom is generally sandy, changing gradually to mud, which is found in the offing.

Pickaninny Lahu.—This town is situated 18 miles eastward of Fresco; some rising ground behind it is known as the Kakraba or small hills.

Half Lahu lies 10 miles east of Pickaninny Lahu, and Grand Lahu nearly 5 miles farther in the same direction, or about 2 miles westward of the entrance to Grand Lahu river.

Grand Lahu river.—The entrance of the river is very narrow, with a dangerous bar across it, on which the sea breaks with so much violence that it is not passable by ordinary boats, and even the native canoes are frequently upset upon it; during floods the river is navigable for small gunboats. Both points of the river are low and sandy; the western entrance point is covered with cocoa-nut trees; on the eastern point there is a small town, but no trees.

The village of Grand Lahu is built on the beach, at rather less than a mile from the mouth of the river; it is easily recognised by a factory with a red roof which occupies the centre of the village, and has four white houses west of it which are equi-distant from each other, and a factory with a white roof east of it.

Communication.—The Marseilles Steam Navigation Company's steamers call at Grand Lahu.

Anchorage may be taken up, about a mile from the shore, over a bottom of sand and mud, with good holding ground, but vessels roll very much.

Mount Lahu, a short range of hills, 350 feet above high water and covered with large trees, stands about $5\frac{1}{2}$ miles N.N.E. of the entrance to Lahu river.

Long hills, a range commencing about 8 miles eastward of Mount Lahu, lie parallel to the coast for 11 miles, and are of about the same height as Mount Lahu.

Tides.—It is high water, full and change, at Grand Lahu river at 4h. 20m. : springs rise 4 feet.

The yellowish water of the river may be seen to the eastward, at 2 miles distant from the land.

COAST.—From Grand Lahu river a high sandy beach continues in a straight line E. by S. $\frac{1}{4}$ S., for a distance of 60 miles to Pickaninny Bassam; and a narrow lagoon or backwater extends the whole distance, at an average distance of about $2\frac{1}{2}$ miles from the shore. The land is everywhere low, without any remarkable object upon it; and the ridge of sand between the lagoon and the sea, being thickly wooded, presents the same uniform appearance throughout, varied only by the numerous villages upon it, round each of which there is a grove of cocoa-nut trees. The beach is everywhere “steep-to,” $3\frac{1}{2}$ and 4 fathoms water being found as close to the surf as it is prudent to venture.

Off Grand Lahu river there are 10 fathoms at a mile from the shore; off Jack-Jack, where there is one white factory, the same depth at three-quarters of a mile; and off Pickaninny Bassam there are 17 fathoms close to the beach. The tops of the trees in the foreground are from 120 to 140 feet above high water but near Jack-Jack they rise to a height of 190 feet.

Amokwa or Half Jack, a town, apparently of considerable size, lies 34 miles eastward of Grand Lahu. The marks for recognising this place are a white-washed house with a flagstaff, and a little eastward of it three large white factories with two flagstaffs on the beach. At times a few vessels are anchored here.

Good water can be obtained here in large quantities, and a considerable trade is carried on in palm oil and cocoa-nuts.

Communication.—The British and African Steam Navigation Company's steamers call here twice monthly, and the Marseilles Steam Navigation Company's steamers have a regular service.

There is telegraphic communication with Grand Bassam.

The natives on the coast between Half Jack and Grand Lahu are said to be very troublesome.

Afugu or Ivory town is a native village situated about 40 miles eastward of Grand Lahu; here trading vessels anchor, and it is the best place to obtain water between Sassandra river and Axim. There is a white house with a zinc roof close west of Half Ivory town.

Pickaninny Bassam is a native village built on a narrow strip of sand about a quarter of a mile wide, which separates the lagoon from the sea.

Bottomless pit.—Near Pickaninny Bassam, in long. $3^{\circ} 57' W.$, is situated an extraordinary feature of this coast, known as the Bottomless pit. The great bank of soundings which fronts the west coast of Africa, and extends to various distances from the shore, falls with various degrees of declivity, but even when steepest, generally preserves a regular descent, is, at this point, divided into two parts by a narrow ravine or gully of very great depth.

East and west of this place the 100-fathoms line is approximately 14 and 12 miles respectively from the land, but here it turns in gradually towards the coast in a funnel shape. At 9 miles off-shore the two lines of 100 fathoms are nearly 4 miles apart, with as much as 400 fathoms between them; at 3 miles from the coast they approach each other within less than a mile, with a depth of 256 fathoms in the channel between.

At a mile from the shore the gully is scarcely a quarter of a mile wide; at a third of a mile there is still a depth of 100 fathoms; and finally, at the head of this singular submarine valley, there are 20 fathoms water at the very edge of the beach. The bottom is generally a soft bluish mud, but at the depths of 190 and 220 fathoms some coral rock was brought up by the lead.

The land continues very low for some distance in shore, with two ranges of hills to the eastward and westward.

There were no eddies nor ebullitions observed in the sea, and while at anchor in a depth of 18 fathoms, three-quarters of a mile off the eastern village of Pickaninny Bassam, no tidal stream was experienced, nor any discolouration of the water observed.

Ordinary boats could not effect a landing, and the natives were several times upset in bringing off fowls, pigs, kids, yams, plantains, and limes.

GRAND BASSAM.—From Pickaninny Bassam the coast trends S.E. by E. $\frac{1}{2}$ E. for a distance of 17 miles to the mouth of Costa river, on the western side of which, at 5 miles within the entrance, is situated the town of Grand Bassam, which has macadamised roads, numerous well-built factories, schools, church, &c., the native village being composed of houses built in the European style.

There are several houses on the shore; those to the west have white roofs, the westernmost being Government house; the roofs of the three eastern houses are red. About 20 small steam-vessels, belonging to the French navy, are stationed at Grand Bassam.

* See chart No. 1,362.

At Grand Bassam, and on the coast from Lahu, curious sounds, resembling the rolling of a boat alongside the ship, may be heard at night; these are caused by a fish, named "Corvinhas" by the Portuguese.

Communication.—The British and African Steam Navigation Company's steamers call twice a month in going to Lagos, and twice when returning to Liverpool, and steamers of the Marseilles Steam Navigation Company have a regular service to this port. Grand Bassam is in telegraphic communication with Accra.

Depth on bar.—The entrance to the river, not easily distinguished from a distance, is between two low sandy points, on the eastern of which there is a clump of trees; it is very narrow, and there is a heavy surf upon the bar, which has a depth of 12 feet at high-water, spring tides; during the best season the bar is practicable for vessels of $6\frac{1}{2}$ feet draught.

Before entering, the bar should be sounded, and buoys laid out, with marks also in-shore. Long vessels cannot enter the river owing to the sharpness of the turn which has to be made after passing the breakers and the rapidity of the river at this part. The bar is generally passable for about two-thirds of the year, but there are no bar pilots nor any bar signals.

The constant discharge from Costa river discolours the sea for a distance of 4 or 5 miles from the shore, and the yellow water may be seen 2 miles west of Grand Bassam, the edge being very clearly defined.

Wreck.—The three-masted vessel *Sainte Antoine* lies sunk in a depth of about 7 fathoms, with the masts showing about 12 feet above water, in the anchorage at Grand Bassam. From the wreck, the French factory on the east side of the entrance bears E. by N. $\frac{3}{4}$ N. distant one mile. Approximate position, lat. $5^{\circ} 10\frac{3}{4}'$ N., long. $3^{\circ} 42\frac{3}{4}'$ W.

Anchorage in about 10 fathoms water, over sand and mud, can be obtained about a mile from the beach, with Government house bearing N. by E.

LAGOONS.—An extensive chain of inland lagoons is situated between Lahu and Assini rivers; their only outlet is through Costa river. The shores of these lagoons are densely peopled and there is a considerable trade in palm oil.

Three streams pour their waters into these lagoons, the principal being the Akba or Komoë river.

Numerous trading posts are established round the shores of these inland waters, and several small steam-vessels ply on them for trading purposes.

Akba or Komoë river joins the lagoon on its eastern side at about 3 miles N.N.E. of the French factories at Grand Bassam; the course of Komoë river has not been explored beyond about 30 miles from its mouth, but it is said to come from a long distance in the interior.

Between April and June the river rises about 15 or 20 feet.

At Alepé, 20 miles above the mouth of the river, are situated some rapids which are, however, passable by small steam-vessels.

Komoë river is connected on its eastern side with two shallow lagoons, known as Ono and Kodiobuë lagoons, which latter extends almost to Assini river; the downward current of Komoë river is very rapid and dangerous to small vessels lying at the anchorage north of the French factories at Costa river.

Potu lagoon, extending northward for about 12 miles from Grand Bassam is narrow and shoal, but navigable for steam-vessels.

Grand Bassam lagoon extends about 65 miles west of Grand Bassam, at an average distance from the coast of about $2\frac{1}{2}$ miles, its western part is only 3 miles from Lahu river.

The lagoon contains many small islands, and the shores are much indented and densely populated.

At Dabu, on the northern side, about 40 miles W.N.W. of Grand Bassam, the fortified French post, no longer occupied, is going to ruins.

At about 4 miles east of Dabu the lagoon receives the waters of Aébi river, which flows into it from a northerly direction; this river, the Komoë and a stream at the head of the lagoon, are the only three which are known to communicate with it. Grand Bassam lagoon is navigable only for vessels drawing 6 feet water; an extensive shoal, on which the depth is 6 feet, lies about 8 or 10 miles east of Dabu.

Assini river, the bar of which is frequently impassable, even for canoes, except during the harmattan season, lies 19 miles east of Costa river; the intermediate beach is nearly straight, with several villages upon it. The coast is free from off-lying rocks, and the soundings are regular up to the depth of 5 fathoms, which is found close to the surf, that commonly runs so high as to render landing impracticable. Near the shore the bottom is generally of fine dark sand, but outside of the depth of 10 fathoms a dark olive mud.

The entrance to this river can be distinguished from seaward, by the surf breaking further off shore than it does in the vicinity; also by the whole of the trunks of the tall trees near the mouth of the river being visible, as there is no brushwood, as in some parts, to hide them.

Anchorage.—The anchorage is in about 10 fathoms water off the western factories; the westernmost factory, a small one-storeyed building

with a red roof, is surrounded by palisades, and stands in the middle of the village.

A large village is close west of the entrance to Assini river, but the French settlement is nearly 9 miles from the mouth of the river, the Residency being situated in the middle of a group of houses and hidden amongst trees.

There are no pilots at Assini. In very fine weather small steam-vessels, drawing 4 feet water, can cross the bar.

Lagoons.—An extensive sheet of water, covering a space of about 35 miles east and west, by 20 miles north and south, communicates with Assini river; the various divisions of these inland waters are known as Abi, Tando or Tano, and Ehi lagoons.

Several streams fall into these lagoons, the principal being the Tano or Tando, which enters Ehi lagoon from a northerly direction. The Tando and Ehi lagoons with the river Tando are free and open to the boats and inhabitants of the French and English Protectorates.

Sueiro da Costa hills, which lie to the westward of Assini river, and 6 or 7 miles inland, rise towards the north-eastward, where Church mount is 540 feet above high water.

Assini.—This town lies about $8\frac{1}{2}$ miles east of the entrance to Assini river, and consists of several European buildings, amongst which there is a white house with a red roof and flagstaff; a native village is close west of these.

Communication.—The steamers of the British and African Company call here twice monthly.

Newtown, $17\frac{1}{2}$ miles eastward of the entrance to Assini river, is an English settlement, where there are some tall palm trees. The French frontier is rather more than half a mile west of Newtown. *See* page 13.

Half Assini or Ewiano, a village with about 1,000 inhabitants, lies 32 miles east of Assini river.

Albani river.—From Assini river a sandy beach extends S.E. by E. $\frac{3}{4}$ E. for a distance of 38 miles, and nearly in a straight line to Albani river, the opening to which is distinguished by its tall trees. Between these two rivers a narrow lagoon extends parallel to the beach at a distance of about a mile from it, and appears to have forced, through the sandy beach, four communications with the sea, which are not connected with any corresponding streams from the interior.

Assini hills.—There is an undulating range of high land along this coast, which may be divided into the Assini, the Albani, and the Apollonia

hills. The western extremity of the former, about 470 feet above high water, is known as the Grotto.

Albani hills.—The western extremity of Albani hills is 340 feet high, but they rise a little towards the eastern part of the ridge, where it overhangs Albani river.

Apollonia hummocks.—To the eastward of Albani river are situated the four hills or hummocks of Apollonia, or, as they are usually named, cape Apollonia; for, lying at an angle of inclination with the coast, and terminating upon the beach, with an extensive level plain to the eastward, they present, when seen from a distance, all the appearance of a long projecting point. The highest of these hummocks is about 284 feet above high water.

Between Assini river and Apollonia the whole country is covered with a dense forest, and apparently but thinly populated to the westward of Albani, but from that town to Apollonia the coast is studded with villages.

Coast.—From the hummocks of Apollonia to Ankobra river, a distance of 23 miles, the land presents the appearance of an extensive plain, covered with forest. A high sandy beach, nearly straight, forms the coast line, and at a few yards from the shore, in the midst of palm-groves, are situated many native villages. The soundings are everywhere regular, with no rocks or shoals, and the quality of the bottom is fine dark sand near the shore, with dark olive-coloured mud in the offing.

Apollonia fort.—This old Dutch fort (the first seen eastward of Sierra Leone) standing on the beach about 4 miles east from Apollonia hummocks was originally one of those strong trading houses used as a residence for the merchants and a store for their goods, afterwards gradually converted into military defences, now in ruins.

Ebomesu river.—A straight and safe coast extends for 12 miles from fort Apollonia to Ebomesu river, the entrance of which is very narrow, with a high surf breaking across it; the river is navigable for surf boats and small steam launches for a distance of about 13 miles in a north-westerly direction to Lake villages.

This straight sandy beach extends only 7 miles east of Ebomesu river, Ankobra river there dividing it from the group of hills and rough ground which form cape Three Points, and the whole aspect of the coast is at once changed.

Ankobra river, winds round the foot of the hills from a great distance inland, and pours out a considerable volume of water into the sea 2 miles N.W. of Axim. It is from 80 to 100 yards wide from its mouth

to Akanko, and about the month of June, when the river is at its highest, has depths of from $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms, but it again becomes low in September. For the first 6 miles from its mouth the river flows through mangrove swamps, after which the banks, on which there are several native villages, become higher.

In this district the forests abound with fine timber, some 8 feet in diameter, the export of which is steadily increasing, but Axim is practically the only port of shipment; the logs are floated down the river. There are steam launches and lighters plying on the river, also a large store just inside the river mouth. Boats are taken up to Tomento, about 50 miles from the mouth, whence there is communication by land with the Wassaw gold mines. At Tomento the river ranges about 25 feet between its high and low state, and tidal influence extends 8 miles up from its mouth.

Bar.—There is a depth of 6 feet upon the bar, with hard bottom, which does not change much, and the rise of the tide is 3 feet.*

Akrumasi point, which forms the east side of the entrance to Ankobra river, has a ridge of black rocks and loose stones extending S.S.W. from it about a quarter of a mile distant. Akrumasi ledge, S.W. $\frac{3}{4}$ W., distant half a mile from Akrumasi point, is a detached ledge of rocks, some above and others under water, between the ledge and Akrumasi point it breaks in bad weather. W. by N., distant one mile from the point, there is a solitary breaker.

AXIM BAY.—From Akrumasi point to Pepré point, the latter low with a few trees upon it, the distance is $2\frac{1}{2}$ miles in a S. by E. $\frac{1}{2}$ E. direction, the coast between forming Axim bay. The fort of St. Anthony situated on a low rocky point, with a sandy bay on either side, and some rocky ledges in front, is situated about a mile northward of Pepré point; the fort is white, and has a dwelling-house erected on it. The ground in the vicinity of Axim is very auriferous, gold being found amongst the sand on the beach. The top of the highest building is 75 feet, and the hills, about two-thirds of a mile to the eastward are 300 feet above high water.

Communication.—The British and African Company's steamers call here twice monthly; and there is telegraphic communication *via* Cape Coast Castle. A new road has been made between Axim and the Ankobra river.

Coal and supplies.—About 120 tons of coal are kept in stock; fresh provisions and water can be obtained, and there is a steam tug.

Hospital.—Here there is a public hospital, maintained by Government.

* See Admiralty plan—Axim bay, No. 1,713; scale, $m = 2$ inches.

Landing.—The landing here is safe, being protected from the heavy swell by the rocky ledges and islets which lie in the vicinity.

Saiaba island, 45 feet in height, lies 9 cables N.W. $\frac{3}{4}$ N. from St. Anthony fort, and half a mile north-west of Ronda point, and is partly connected with it by a chain of rocks, between which there are deep passages for boats; a large flat rock, nearly awash, is situated half a cable south-west of Saiaba island. A ledge of rocks projects, for a distance of about a cable, from Kebrada point, at a quarter of a mile north of the fort, and two large groups of rocks which lie immediately in front of the fort, afford protection and shelter to the adjacent beach.

Paka island (Giba) and Bobowasi islands are situated south-west of the fort, and between them and the shore, so far as Pepré point, the space is nearly filled by rocks and ledges; Bobowasi island has a clump of palm trees on its summit. These islets and ledges are all “steep-to” on the western side, having a depth of 4 fathoms close to them.

Dangers.—A rock, on which the least depth is $4\frac{3}{4}$ fathoms, lies with Akanko Custom house bearing N.E. $\frac{3}{8}$ E., distant $2\frac{2}{10}$ miles, and the south extreme of Pepré point S.E. by E.

A rock, with $3\frac{1}{2}$ fathoms water over it, lies about a cable south of the preceding, with Akanko Custom house bearing N.E. $\frac{1}{4}$ E., distant $2\frac{3}{10}$ miles, and the south extreme of Pepré point S.E. by E. easterly.

A rock, having a depth of $4\frac{1}{4}$ fathoms over it, lies $5\frac{1}{2}$ cables east-south-east of the preceding; from this rock Akanko Custom house bears N.E. by N., distant $2\frac{1}{10}$ miles, and the south extreme of Pepré point S.E. $\frac{3}{4}$ E.

Hoeven rock, a rocky head of about 10 yards in extent, with 9 feet least water, lies with the following bearings and distance :—Akumasi point, N. $\frac{3}{4}$ E., Fort St. Anthony, Axim, E. $\frac{5}{8}$ S., distant $1\frac{3}{10}$ miles, and Pepré point, S.E. $\frac{1}{8}$ E.

Foul ground, with depths of from 4 to $5\frac{1}{2}$ fathoms extends from the rock, for the distance of half a cable in all directions.

Buoy.—A conical shaped buoy, painted red and surmounted by a staff and globe, is moored, in 5 fathoms water, about three-quarters of a cable south-east from Hoeven rock; but it is liable to break adrift, and should not be relied on for position.

Shoal.—A shoal, with $3\frac{1}{2}$ fathoms water over it, on which s.s. *Benin* touched, is situated in a position with St. Anthony fort bearing E. $\frac{1}{2}$ N., distant $7\frac{1}{4}$ cables, and the south-west extreme of Pepré point S.S.E. $\frac{5}{8}$ E.

CAUTION.—Several shoals having recently been reported in Axim bay, and it is possible that others may exist, great caution is necessary in seeking an anchorage.

Water may be purchased at Axim in small quantities ; but the water, procured from a well behind the fort is not of good quality.

Trade.—In 1897 the value of timber exported amounted to 90,569*l*.

Anchorage may be obtained in 6 fathoms water, with St. Anthony fort bearing E. by N. ; or a good berth may be taken up with Saiaba island summit bearing N.N.E. and St. Anthony fort bearing E.N.E.

Tides.—It is high water, full and change, in Axim bay at 4h. 30m. ; springs rise 4 feet.

Depths off shore.—The change in the character of the coast which occurs east of Ankobra river makes none in the regularity of the soundings, the bank to the 100-fathoms line off Axim bay being about 20 miles in breadth, and the bottom of fine sand, the depths diminishing gradually from 100 fathoms to 3 or 4 fathoms near the surf.*

PENINSULA POINT.—From Pepré point to a point known as the Peninsula, the distance is 6 miles in a south-east direction, the space between being divided into several bays by rocky points, all safe to approach within a distance of a quarter of a mile. The ground about midway between Pepré point and the Peninsula rises to a small hill named Mount Terceira, which is 300 feet above high water. The Peninsula appears like a low island when seen from the westward, and there is a remarkable single tree a little in shore of it.

Bradenburg fort.—Eastward of Peninsula point, a long straight beach is interrupted by a projecting rock, on which stands the ruin of fort Bradenburg, 115 feet above high water ; and which, being overgrown with dark trees and shrubs, is the more conspicuous from its contrast with the white sandy shore on either side.

Westward of the fort there is a small river, which is said to flow from amongst the hills to the northward, and which passes behind the fort to a second outlet at Sekan point, a low rocky ridge near the eastern extremity of the beach. There the land rises rapidly to mount Heathfield, elevated 445 feet above high water, and the highest hill in the vicinity of cape Three Points ; viewed from the westward it appears as a bold bluff.

West point.—The shore from Sekan point turns to the southward towards Frederick and West points, which latter is a rocky bluff, with some rocks at its base, forming the southern extremity of Brandenburg bay, as well as the western extremity of cape Three Points.

* See chart No. 1,362.

CHAPTER XII.

CAPE THREE POINTS TO CAPE ST. PAUL.
GOLD COAST.

VARIATION IN 1900.

Cape St. Paul - - - 16° 20'
Decreasing about 3½' annually.

CAPE THREE POINTS lies S.E. $\frac{7}{8}$ S., distant 1½ miles, from West point, and projects from the mainland in a south-westerly direction about half a mile, with a large rock, known as the Boidan, lying half a cable off its pitch.*

When seen from the eastward or westward the cape appears as two hills, on the northern of which there is a tree known as the Cape tree, and on the southern is situated the lighthouse, in latitude 4° 45' N., and longitude 2° 6' W.

LIGHT.—On the middle point of cape Three Points a lighthouse, 20 feet in height, and painted white with a red lantern, exhibits, at an elevation of 75 feet above high water, a *fixed white* light, which should be visible, in clear weather, from a distance of 13 miles, and may generally be depended on.

Boidan rock, 20 feet above high water, and remarkable when seen from either the westward or eastward, is “steep-to,” having 5 fathoms water close to the surf, which breaks around it. |

Between Boidan rock and the shore are some rocks above water, and others which are covered.

Cape shoals.—At three-quarters of a mile off cape Three Points, between the bearings of W. by S. and S.W. by S., there are some dangerous rocks named Cape shoals. The least water found on them was 2½ and 3 fathoms, but the soundings all round are very irregular, and the bottom everywhere of rock, the shallow portions of the shoals appearing to be large detached masses with deep intervening fissures.

The lead is a bad guide to clear them, as to the westward there is little more than a cable from a depth of 11 to 3 fathoms, and to the southward

* See Admiralty plan.—Cape Three Points, No. 1,713; scale $m=2$ inches; also Admiralty chart.—Africa, West Coast, Sheet XIII., cape Three Points to Barako, No. 1,359, scale $m=0.25$ of an inch.

from 14 fathoms to that depth. These shoals are the more dangerous as the sea does not always break on them, and even when heavy rollers break in succession, there is occasionally a considerable interval of time before others of sufficient volume come up.

Clearing marks.—Akwidá point, open of East point, bearing E. by N. $\frac{3}{4}$ N., leads half a mile southward; and the sandy beach east of Frederick point, open of West point, N. by E. $\frac{3}{4}$ E. leads half a mile westward of Cape shoals; at night no vessel should approach them, on the western or southern sides, nearer than a depth of 19 fathoms.

Inner channel.—There is a channel, half a mile in breadth, between cape Three Points and Cape shoals, but the ground is very uneven, with some rocky heads on which the depths are 4 and $4\frac{1}{2}$ fathoms. Few vessels can have any object in using this channel, but when necessary, perhaps the safest course to adopt will be to keep close to Boidan rock, as 5 fathoms will be found there; the shoal water seems to lie in the form of a ridge from thence to the outer shoals.

Tides.—It is high water, full and change, at cape Three Points at 4h.; springs rise 4 feet.

River point.—At a third of a mile north-east of cape Three Points there is a small rivulet with a rock in the middle of the entrance, and a rocky hillock on its eastern side known as River point; and at half a mile farther eastward there is another outlet to the same stream. Two rocky flats extend here from the beach, on the eastern of which stands a tall stone, on account of its resemblance named Nine Pin rock.

Anama point lies $1\frac{1}{2}$ miles eastward from cape Three Points; and is quite safe of approach, for most of the rocks which lie round are visible, and have 7 fathoms water close to them.

East point.—A rocky bay, nearly a mile across the mouth, with two small islets in it, lies between Anama point and East point, which latter bears from cape Three Points E. by S. $\frac{1}{2}$ S., distant $2\frac{1}{2}$ miles. East point, forming a high salient headland, is “steep-to,” having 4 or 5 fathoms water close to on all sides. A large tree on the elevated ground above the point has a remarkable appearance when viewed at a little distance on either side, and distinguishes it from any of the adjacent points.

The whole extent of cape Three Points, that is to say, the space from West point to East point, is a series of hills with abrupt sides and rocky points, but without dangers that are not visible at all times, the Cape shoals excepted. In the offing the bottom is generally of soft blue mud, though with some sandy and rocky spots.

See chart No. 1,713.

COAST.—From East point the coast continues of the same character for three-quarters of a mile; the higher lands then recede from it, leaving an undulating country of less elevation between them and the coast, and the shore forms a sandy bay as far as Stephens point, a rocky knoll at the western side of Akwida cove. The eastern side of this cove is a small peninsula, crowned by the ruins of Akwida fort.

Akwida cove is divided into two little sandy bays, the western of which is obstructed by rocks, but the other affords tolerably good landing on the beach at high water. In the rainy season there is a small stream named the Alligator, with its outlet close to the point which separates the bays.

The entrance of the cove is not more than $1\frac{1}{2}$ cables wide, with $3\frac{1}{2}$ fathoms water in mid-channel, over a sandy bottom, but shoaling rapidly to the beach. From each of the outer points, rocks extend, for about $1\frac{1}{2}$ cables, to the south-west.

Achowa point.—From Akwida a sandy beach, 3 miles in length, trends in an E. by S. direction, terminating at Achowa, a broad point consisting of several rocky projections. Achowa rocks, large and above water, lie off this point, which may be distinctly seen from cape Three Points; and off each of its angles there is a short reef. On the high ground above its western hill there is a grove of trees, the tops of which are 220 feet above high water, and which show well when approaching the point, particularly from the westward.

Depths off shore.—The soundings between East and Achowa points are very irregular between the shore and the depth of 13 fathoms, within which strangers would do well not to approach. That space contains also some rocks near the shore, which are to be seen above water, with channels of 4 fathoms water inside of them; while others lie farther out, and have but a depth of 3 feet, giving little or no warning of approach by the lead.

East rock, on which the depth is 3 feet, lies S.W. $\frac{3}{8}$ S., distant 7 cables from Akwida fort.

Akwida rock, with 3 feet water over it, lies S. $\frac{3}{4}$ E. distant $1\frac{1}{10}$ miles from Akwida fort.

A small rock above water lies E. by S. $\frac{3}{8}$ S., distant $1\frac{1}{10}$ miles from Akwida fort; from the rock a line of detached shoals extends, in a southerly direction, for a distance of 6 cables, where there is a rock with less than 6 feet water over it.

A shoal, on which the depth is 3 fathoms, lies S.W. by W., distant $6\frac{1}{2}$ cables from Achowa point.

See chart No. 1,713.

These sunken dangers are the outer of those between East and Achowa points; for a description of those near the coast the mariner is referred to the Admiralty plan of Cape Three Points.

Achowa village.—The village of Achowa stands in a small sandy bay, half a mile north-east of the point of the same name, and from thence a rocky indented coast extends to Dix cove.*

DIX COVE, nearly 2 cables in width at the entrance, and about the same in length, is full of rocks; these leave, however, sufficient room in some places to moor boats or very small vessels. A conical heap of rocks, forming a small islet, lies west-south-west of Dix cove fort, and a reef of rocks extends from it rather more than a cable in a S.S.E. direction, leaving a narrow channel on each side of it.†

Ahanta point, the south-west entrance point, is surrounded by a belt of rocks, which occupies half the cove; and from Swanzy point, on the eastern side, a similar belt fronts the shore to Hood point, about a quarter of a mile north-east of it. On this belt, and half a cable southward of Swanzy point, there is a black rock, named by the natives Kumbrini, or the white man's death rock, in allusion to an accident which happened there.

There are two boat channels into Dix cove; one between Kumbrini and Islet reef, in which at low water there are only 3 feet abreast of the islet; and the other between Islet reef and Ahanta point, with 6 feet in it; they are both very narrow, but the eastern is generally preferred, though leading close west of Kumbrini rock.

At low water, and with fresh southerly breezes, the sea breaks entirely across the entrance to Dix cove, but it seldom happens that the natives cannot get off to a vessel in their canoes; and in fine weather ordinary boats can generally land and find shelter in the cove; the bottom is sandy, with a depth of 3 or 4 feet among the rocks.

Dix Cove fort.—The town is situated on the north side of Dix cove, and extends from the fort to a piece of water, which is stagnant, except during a portion of the rainy season, when it is always a resort for alligators. The fort, square shaped, white, and with a dwelling-house on it, stands on ground about 30 feet above high water, north of Swanzy point; its battlements are about 30 feet high.

At a mile in shore from the fort, the land rises to a height of 250 feet, and at 6 miles to the northward Mount Swanzy is 390 feet above high water.

There are several large trading houses on the beach which may assist in identifying the place, but the fort, being white, is a conspicuous object when approaching Dix cove. At night the lights of the town are of good service.

* See Admiralty chart:—Achowa point to Cape Coast Castle, No. 3,113; scale, $m = 0.8$ inch.

† See Admiralty plan.—Dix cove, No. 1,713; scale, $m = 6$ inches.

Communication.—There is a telegraph station at Dix cove.

Water.—The fort has a large tank for its own use, but vessels of war may generally obtain water from it on application. Very long hoses are required to lead the water from the fort to a boat at anchor in the small bight at its base. The country is covered with forest, and wood may be cut if required. Some refreshments may be procured for money or barter, but not sufficient for a vessel of war of any size.

Tides.—It is high water, full and change, in Dix cove at 4 h. 0 m. ; springs rise 4 feet.

Abokori islet, one mile eastward of Dix cove, is small, low, and rocky ; some portions of it are covered with coarse grass. The channel between this islet and the coast is half a mile wide, but near the middle there is a rocky shoal with $2\frac{3}{4}$ fathoms water over it, and a narrow passage on either side of it 3 or 4 fathoms in depth. A few rocks surround the islet, but not extending farther than three-quarters of a cable from the shore. This channel affords no shelter for vessels.

Butri.—In the small sandy bay opposite Abokori islet stands the little village of Bushau, close to the beach ; the bay terminates $1\frac{1}{2}$ miles farther eastward at Butri point, which is bold and rocky. N.N.E. of this point there is a rivulet, on the western side of which stands the ruins of the small fort of Butri or Bartensteen, close to the beach. Mount Bartensteen, covered with high trees, and bearing about North from the fort, rises to the height of 438 feet above high water.*

The landing is very good at the mouth of the rivulet, though numerous large boulders must be avoided.

COAST.—At $1\frac{1}{2}$ miles eastward of Butri a sandy projection of the shore terminates in Adoblo rock, a large black rock shaped like a haystack ; from this the character of the coast, which for 3 miles was almost “steep-to,” changes, and is fronted by reefs, with irregular soundings and projecting rocky shoals. Adoblo rock is surrounded by one of these reefs, extending a quarter of a mile from it in all directions ; and at a mile farther to the eastward, another reef extends more than a mile from the shore into the stream of 10 fathoms ; among all these shoals there are intricate channels available for boats.

Pompendi point.—At about $3\frac{1}{2}$ miles east of Adoblo rock stands the town of Pompendi, on a projecting point, which consists of two stony hillocks with a sandy bay between them ; several rocks, on which the sea at times breaks heavily, lie south of Pompendi point. Above the town there is a grove of large trees, which helps to distinguish the place.

Shoal.—A shoal, with 3 fathoms water over it, lies $2\frac{3}{4}$ miles, E. $\frac{7}{8}$ S., from Adoblo rock and one mile from the shore ; from the shoal the grove of trees at Pompendi bears N.E. by N.

See chart No. 1,713.

* See chart, No. 3,113.

Pompendi reef.—From the south extreme of this reef, which extends three-quarters of a mile from Pompendi point into the stream of 6 fathoms, the grove of trees bears N. $\frac{2}{3}$ W.; foul ground extends to the eastward of Pompendi point for nearly a mile.

Ajua.—The village may readily be distinguished by the European houses on the shore, one being conspicuously placed on the point. The village and low rocky point of Ajua are situated E.N.E., distant $1\frac{1}{2}$ miles from Pompendi, and thence a white beach extends 4 miles to the low sandy point of Takoradi.

In this space there are two shoals with $2\frac{1}{2}$ and $3\frac{1}{4}$ fathoms on them, both bearing S. by E. from Ajua, the outer and deeper lying three-quarters of a mile off shore; a little farther to the eastward a broad belt of reefs commences and continues to fringe the shore to Takoradi point, the average distance of its outer edge from the coast being about half a mile. On reaching that point it turns suddenly towards the shore, in a N.N.E. direction and then again suddenly turns to the eastward for a distance of about two-thirds of a mile.

Communication.—There is a telegraph station at Ajua.

Takoradi reef, detached from the fringe of shore reefs, lies still farther out; in shape it is circular, its diameter is a third of a mile, and the centre bears E.S.E., distant about a mile from Takoradi point. Several of the rocks upon it show above water, and it will be safer for vessels not to approach it within a depth of 10 fathoms. A depth of 5 fathoms will be found at the edge of the surf, being $1\frac{1}{10}$ miles from Takoradi point.*

In navigating between Dix cove and Takoradi point, vessels should not approach nearer to the shore than a depth of 11 fathoms, unless desirous of trading.

TAKORADI BAY.—Sekondi point bears N.E. by E., distant $4\frac{1}{4}$ miles from Takoradi point. The coast recedes suddenly to the northward at Takoradi point and forms Takoradi bay, the shore of which is composed of several small bights, divided by rocky points.

The ruins of a fort stand on the south side of one of these bights, upon a bold point, about 80 feet above high-water, and distant 9 cables in a north-north-east direction from Takoradi point; it is now a complete ruin, and so overgrown with shrubs and trees that it cannot be easily distinguished. There is a grove with some tall trees, which are very conspicuous, a little northward of the fort; at the base of the fort there is a village, and another at Apoasi a mile north of it, the natives of the latter are said to be treacherous. At both of these places boats may land with facility under the protection of the adjacent reefs.

Apoasi bluff is fringed with reefs, and a reef extends, in a north-east direction, half a mile from it, and nearly midway between Apoasi bluff

* See chart No. 3,113.

* See Admiralty plan.—Takoradi bay, No. 1,713; scale, $m = 10$ inches.

and Sekondi point, a reef extends about 2 cables from the shore, with these exceptions the beach is clean from Takoradi fort as far as Sekondi point; and a vessel may beat up in this bay, when working to the westward, by paying attention to the lead. The bottom is of sand and mud, but rocky near the reefs off Takoradi point. The rollers, which to the westward of that point generally break in upwards of 2 fathoms water, are here comparatively smooth.

Takoradi bay affords more shelter than any other anchorage between Fernando Po and Sierra Leone.

Supplies.—Water cannot be procured, but goats, ducks, yams, and fruit are abundant.

Barracouta rock, with $2\frac{3}{4}$ fathoms water on it, lies N.E. $\frac{1}{2}$ N., distant $1\frac{3}{4}$ miles from Takoradi point, and 3 cables from the shore.

SEKONDI.—Sekondi point is a bold rocky cliff 80 feet above high water, surmounted by fort Orange, which is a square building of about 180 feet each way, with bastions at the angles; it has a dwelling-house erected on it and, being white, is very conspicuous. A fringe of rocks extends about half a cable east, and nearly a cable north-north-east from the point, between which latter and Butatel point there is a small bay about a quarter of a mile wide, with depths of from 3 to 8 feet.*

The village of Sekondi, with a population of about 1,000; the shops, stores, and offices of the railway company, and a hospital are all situated to the northward of fort Orange. The soil in the vicinity is prolific, and the population industrious; the yams obtained here are supposed to be the finest on the Gold coast; and the native fishermen cure a quantity of fish, with which they traffic in the interior.

Communication.—The mail steamers call by arrangement when there is sufficient produce for shipment, generally five or six times in the year. A railway is in course of construction to Tarkwa, a distance of 39 miles.

Harbour works.—A breakwater of masonry is to be constructed for a distance of 750 feet in a north-north-east direction from Sekondi point with a depth of 13 feet at low water at its extremity, and an iron jetty, 300 feet long, is in course of construction on the south-west side of the bay; this jetty will have three lines of rails, a portable steam crane which will lift 5 tons, and landing steps on its north side.

Landing may be effected at the pier steps, or on the beach, between the pier and the ledge of rocks extending north-north-east from Sekondi point.

Anchorage.—A good berth for vessels of war is in 7 fathoms water, over sand and stones or mud, with Tsiakur Bansu point bearing N. $\frac{3}{4}$ W.

See chart No. 1,713.

* See Admiralty plan:—Sekondi bay, No. 3,093; scale, $m = 6$ inches.

and fort Orange flagstaff N.W. Merchant vessels anchor with fort Orange flagstaff bearing N.W. $\frac{3}{4}$ W., and Tsiakur Bansu point North in a depth of 5 fathoms, over sand, suitable only for a vessel of moderate draught, in fine weather, and it would be prudent not to remain during the night, or should a swell set in. With Tsiakur Bansu point bearing N. by W. $\frac{3}{4}$ W. and fort Orange flagstaff W. by N. $\frac{1}{2}$ N. there is anchorage in from 6 to 7 fathoms water, over sand and stones, which could be used in the rainy season, or with much swell, but it is desirable to keep the pier bearing about N.W. $\frac{1}{2}$ W. to facilitate loading and discharging. With the fort flagstaff bearing west of N.W. $\frac{1}{2}$ W. the bottom is very rocky and uneven.

H.M.S. *Barrosa* found the sea quite smooth at Sekondi in the month of November.

Tides.—Springs rise $4\frac{1}{2}$ feet; neaps rise $3\frac{3}{4}$ feet.

COAST.—Aboaddi point is the next salient point east of Sekondi, and bears from it E. by N. $\frac{1}{4}$ N., distant $4\frac{1}{2}$ miles, the coast between forming a bay about a mile in depth, containing several sandy beaches and abrupt rocky points, off which there are generally a few rocks. Between its extreme points the depths are from 4 to $5\frac{1}{2}$ fathoms, decreasing regularly to the shore, and with no danger at a quarter of a mile from the beach. The surrounding shores have a broken appearance, though of a tolerably uniform height when viewed from a distance of 4 or 5 miles, and are without any remarkable features.*

Suchu reef.—Off Suchu point, nearly midway between Sekondi and Aboaddi point, there is a small reef half a mile in length, extending parallel to the coast, with a boat channel inside it. Off the mouth of Anamkwon river (which is barred in the dry season) about a mile north-east of Suchu point, there are a few rocks.

Aboaddi point, a double point of low rocks, with a clump of palm trees, conspicuous from seaward, near its extremity, has a narrow reef extending half a mile in an E. by S. $\frac{3}{4}$ S. direction from it; several rocks on this reef are above water, one, having a white top, lies $1\frac{1}{2}$ cables from the point.

Landing.—There is a village situated at the foot of the hillock which rises from Aboaddi point, and the landing to the eastward of it is good, being sheltered by the reef which extends from that point.

Sherbro bank.—A shoal, with 19 feet water over, and 4 fathoms around it, lies off Aboaddi point; from it Aboaddi point bears N.E. $\frac{1}{4}$ E., distant $1\frac{1}{4}$ miles, and Sekondi fort West; Sherbro bank breaks when the rollers are unusually heavy.

See chart No. 3,093.

* See chart No. 3,113.

The *Stamboul*, drawing $18\frac{1}{2}$ feet water, touched a shoal, apparently an extension of Sherbro bank to the south-westward, lying with Aboaddi point bearing N.E. $\frac{3}{8}$ E. distant $1\frac{7}{10}$ miles, and Muraba, W. by N. $\frac{5}{8}$ N.

Roani bank, 3 miles S. by W. $\frac{1}{2}$ W. of Aboaddi point, is a rocky bank one mile in length, in the stream of 11 fathoms; the least depth on it is 6 fathoms. It is said to be a favourite fishing ground.

Bassubu rocks lie E. by N. $\frac{3}{4}$ N., distant three-quarters of a mile from Aboaddi point, the coast between forming a little sandy bay; from them a reef projects nearly half a mile in an easterly direction. At half a mile farther to the northward there is another foul point with a similar reef extending from it, and from thence to Chama bay the coast is fringed by a succession of reefs, with $3\frac{1}{2}$ fathoms water close to their outer edge. They lie within a third of a mile from the shore; but there is one detached rock, with 10 feet water over it, which generally breaks, and which bears S.S.E. $\frac{3}{4}$ E., distant $1\frac{1}{10}$ miles from the fort of Chama, being one mile from the shore.*

CHAMA BAY, extending from Aboaddi point to the Red cliffs of Kotobrai, is nearly 2 miles deep; shoaler water than charted is reported in this bay.

Chama fort.—The fort of Chama (pronounced by the native Eshama) stands upon a rising ground about 300 yards from the beach, behind the native town, which it overlooks. It is a strongly built square edifice, with bastions at the angles, a dwelling-house on it, and surrounded by a wall, and being white, is very conspicuous from seaward; the truck of the flagstaff is 74 feet above high water.

The approach to Chama fort is obstructed by reefs of rocks, through which there is a narrow passage for boats at low water (provided the surf be not high), as the winding channel between them may then be perceived. At high water they are all covered except a few large boulders, and the sea breaks so heavily as to present, to a stranger, no apparent channel. The landing place is to the eastward of the fort, though canoes safely wind their way among the western rocks.

Communication.—There is a telegraph station at Chama.

Dispensary.—A free dispensary at Chama is maintained by the Government.

Dangers.—**Mamua rock** in the fairway of Chama bay, about 4 cables in length, east-south-east and west-north-west direction with a

See chart No. 3,113.

* See plan of Chama bay; scale, $m=1\cdot0$ inch, on Admiralty chart, No. 1,713.

general breadth of about a cable, has 11 feet least water over it, and at its eastern and western extremes there are depths of 17 and 14 feet respectively; the bottom is very rocky and uneven; from the shoalest part Chama fort bears about W.N.W., $1\frac{1}{10}$ miles.

Buoy.—A conical shaped buoy, painted red, is moored about 2 cables south-east of the centre of the rock, with Chama fort bearing N.W. by W. $\frac{1}{2}$ W., and Busum Prah river N. by W. $\frac{1}{4}$ W. See Caution; buoyage, page 33.

Prah rock, with 6 feet water over it, and 3 fathoms close round it, is very small; it bears E. $\frac{1}{4}$ S. from Chama fort, distant one mile; and S.S.E. two-thirds of a mile from the mouth of Busum Prah river.

The ss. *Ville de Ceara*, 1894, when at anchor in Chama bay, struck a rock (depth not mentioned) lying with Chama fort, bearing W.N.W., distant about 2 miles, and Aboaddi point, W. by S. $\frac{2}{3}$ S.

Anchorage.—Vessels may anchor in Chama bay, in 7 fathoms water, over sand and mud, with the fort bearing N.W., distant about $1\frac{3}{4}$ miles; the trend of the coast affords considerable protection from the swell, even in the rainy season.

Busum Prah river, which falls into the bay between two lagoons, one mile north-east of Chama fort, is said to come from a considerable distance inland, and to be navigable for vessels for a distance of 90 miles from its mouth, above which there is canoe communication with Kumasi, but was only examined for about $2\frac{1}{2}$ miles from its mouth, where it was 100 yards in width and 4 fathoms in depth. The water was quite fresh, and the banks, fringed with mangroves, were only 3 or 4 feet above the stream.*

The ground, which to the westward rises considerably above fort Chama, sinks into a flat country to the northward. Some hills, however, are seen in the north-west, and one, distant 9 miles from the fort, bears N.E. by N. from it.

Bar.—There is only a depth of 2 feet on the bar, which is impassable by ordinary boats, but the natives take their canoes both in and out of the river.

Kotobrai cliffs.—A straight beach, nearly 4 miles in length, extends from Busum Prah river to the red earth cliffs of Kotobrai, which are five in number, with small sandy bays between them, and some large rocks above water at their base. An irregular line of rocks and breakers

See chart No. 1,713.

* See chart No. 3,113.

commences a mile to the westward of these cliffs, and fronts their whole length, but it extends only a quarter of a mile from the beach.

The highest land in the vicinity of the cliffs is about 270 feet above high water, whence the ridge descends gradually to the lagoon near Busum Prah river to the westward, and to Abroti river to the eastward, which latter, like most of the streams on this coast, has no communication with the sea till the rains begin.

Gold hill.—Assay point, or Gold hill, bears E. by S., distant $3\frac{1}{2}$ miles from Kotobrai cliffs, the coast between being nearly a straight beach of sand. The point forms but a slight projection from the coast line, but, being surmounted by an isolated hummock, it has a remarkable appearance when seen from the westward.

Kommenda point.—From Gold hill to Kommenda point the shore is low and fronted by rocks. Kommenda point is also low and rocky, and close eastward of it the river Susn passes between the forts of Kommenda. The fort, standing on the western side of the river, is a square building of about 190 feet each way, with bastions at the angles, but having been for some years abandoned, it is rapidly going to decay.

Landing.—A native town stands at the foot of each fort, and tolerably good landing will be found in the little recess of the beach between them, under the high bar of Susn river, the waters of which seldom break through it in the heaviest rains, but expand into a shallow pestilential lagoon.

Ampeni point.—From the rocky point of Kommenda, the village of Akal aki, situated on the beach, bears E. $\frac{1}{4}$ S., distant one mile, and Ampeni point (which is also low) E. $\frac{1}{2}$ S., distant 3 miles. A ledge of rocks extends about $1\frac{1}{2}$ cables eastward from Ampeni point.

Kassi reefs, which extend E.S.E. for a distance of $1\frac{1}{2}$ miles, are separated from the ledge off Ampeni point by a 2-fathoms channel available for boats. A depth of $3\frac{1}{2}$ fathoms is found close to the outer edge of the reefs, and the surf at times breaks over them in high rollers.

H.M.S. *Decoy*, in 1873, passed inside Kassi reefs, but found the depths very irregular, having at one time 4 fathoms on one side and 2 fathoms on the other.

Ampeni.—The town of Ampeni, which stands on the shore at half a mile eastward of Ampeni point, contains a large population; and a little farther to the eastward there is another town, Akimfu, which is built on the summit of a small hill. Between the two towns the river Akiabu comes down to the back of the beach, after winding among the rising grounds that approach the coast on its western side; at three-quarters of

a mile east of Akimfu there is another pent-up river, named the Branu. The land about here appears broken into small hills, one of the highest of which, on the eastern side of Branu river, is 200 feet above high water.

Amkwana.—The village of Amkwana stands on the beach about $1\frac{1}{2}$ miles eastward of Branu river, and a little east of the village there is another stagnant river, known as the Bibo.

Busum Accra reefs.—From about three-quarters of a mile west of Amkwana the Busum Accra reefs front the shore for a distance of 2 miles, showing themselves in four distinct patches, on which the rollers break heavily. There are 4 fathoms close to their outer edge, and their eastern extreme lies half a mile from the shore.

Coast.—From Amkwana to Elmina the coast rises into downs of moderate elevations at various distances from the beach, many of them have been cleared of forest, and are now cultivated. The beach is a hard sand, and nearly straight for 3 miles to Elmina point.

Elmina point, the western extremity of Elmina bay, and on which stands the fort of St. George del Mina, is surrounded by rocks, which extend to the eastward, and on which the sea breaks with great violence, especially when the sea breeze sets in. The outer rock on the reef extending eastward from Elmina point uncovers 2 feet at low water, and has a depth of 8 or 9 feet close outside it; this rock lies three-quarters of a cable from the extremity of Elmina point. In the vicinity of this reef the bottom is fine black sand.*

Rollers break at a distance of $1\frac{1}{2}$ cables from Elmina point in fine weather, but in bad weather they extend to 3 cables from the shore.

ELMINA BAY.—From Elmina point the shore recedes to the northward for about a third of a mile, forming Elmina bay; the surrounding country is undulating and thickly wooded, with some residences and farms, which afford agreeable retreats from the heat of the town.

Elmina castle.—The castle of St. George del Mina stands on a low rocky peninsula, on the southern side of the small river Beya, which passes within 20 yards of one of its gates, and was, with the other Dutch settlements on the Gold coast, transferred to the British Government in 1872; it was in a good state of repair, and occupied by the Haussa police force in 1892.

The channel leading into Beya river lies on the northern side of the passage between the stone embankments, and is from 3 to 4 feet deep, and between the river entrance and the reef extending from Elmina

See chart No. 3,113.

* *See Admiralty plan.—Elmina, No. 1713; scale, $m=4$ inches.*

point there are depths of from 3 to 8 feet, over fine black sand with rocky patches. This peninsula is connected by a wooden bridge with the opposite bank, and from this bridge to the sea the river is confined between two stone embankments.

The bridge across the river within the entrance is 6 feet above high water, and is built on two arches, each 20 feet wide; above this bridge for a short distance Beya river is about 40 feet wide, with a depth of from 3 to 4 feet in mid-channel on a black sandy bottom.

The deposit from Beya river is slight and appears to be carried well to seaward by the ebb stream.

A large native town, which occupies the whole breadth of the isthmus, extends along the beach westward of the castle, and communicates with it by a drawbridge. The fort of St. Jago stands on a hill about a 100 feet above the sea on the north side of Beya river; De Veers redoubt is situated westward of the town south of the river, and Beckenstein redoubt near Beya river, to the westward of fort St. Jago.

Elmina is a good place to make, when coming from the westward and bound to Cape Coast Castle. The fortifications of Elmina are yellow, while those at Cape Coast are red.

Communication.—There is a telegraph station at Elmina.

Coal and Supplies.—No coal can be obtained, but there is sometimes a small stock of patent fuel; fresh beef and bread may be procured; vegetables are scarce, and if required notice should be given.

Good water may be obtained from Sweet river between Cape Coast Castle and Elmina.

Hospital.—There is a public hospital, maintained by the Government, at Elmina.

Landing.—The rocks off Elmina point are of essential service in sheltering the landing place at the mouth of Beya river, where the water is, however, very shoal; ordinary boats should only land on the beach at high water.

Landing may be effected in ships boats in the Beya river during the dry season when the surf is not very high, but, the entrance being obstructed by a bar, it is not a safe landing place for them at or near low water. In making for the river, the rocks off Elmina point should be given a wide berth steering out into the bay until the river is well open. It is said that at one time Dutch vessels of 50 to 90 tons could enter Beya river at high water. A Government surf boat communicates with vessels of war off Elmina.

Anchorage.—In Elmina bay the depth of 18 feet is generally about $2\frac{1}{2}$ cables from the beach and the same distance from Elmina point; but

there is a shoal, with that depth over it, in the centre of the bay, with Elmina point bearing W. by S. $\frac{5}{8}$ S., distant $3\frac{1}{2}$ cables; the bottom is of fine black sand affording fair holding ground. Anchorage may be taken up off Elmina in 7 or 8 fathoms water, over sand, or shells and mud, with St. George castle bearing N.W. $\frac{1}{2}$ W. distant about a mile; or with mount Ekwafu well open eastward of fort St. Jago N.N.W. $\frac{1}{2}$ W.; in a depth of 5 fathoms, over black mud, with the south-west angle of St. George castle bearing W.N.W. and the redoubt, in ruins, near the Governor's house N.N.W.; or if necessary, a vessel may anchor for the night in a depth of 13 fathoms, 5 miles off the land, between Elmina and Cape Coast Castle.

Current.—Round Elmina bay the current follows the course of the shore from west to east; there is an indraught to Beya river on the flood.

Tides.—It is high water, full and change, at Elmina at 4h. 30m.; springs rise 6 feet. The tidal streams at the entrance of the Beya river run very strongly at springs.

COAST.—A slightly curving beach, nearly 7 miles in length, extends from Elmina to Cape Coast Castle; near its western extremity there are two small barred-up rivers, and between them the shore line is rocky, but the rest of the beach is clean, and the soundings up to it regular.

CAPE COAST CASTLE.—The castle of Cape Coast (a singular corruption of the original Portuguese name, Cabo Corso), is built on a rock which stands on a projecting point of the line of the shore. From the landing-place the ground rises gradually to the castle, which contains the official residences, with a chapel, school, hospital, and storehouses, besides the hall of justice. There are also several spacious water-tanks from which vessels are occasionally supplied, but only by permission. At a short distance from the castle three detached forts named fort Victoria, fort Macarthy, and fort William, are situated on commanding hills.*

LIGHT.—The lighthouse at fort William, Cape Coast Castle, situated 3 cables inland and in latitude $5^{\circ} 6' N.$, longitude $1^{\circ} 14' W.$, is a cylindrical stone tower, 46 feet in height and painted white; it exhibits, at an elevation of 192 feet above high water, a *fixed white* light, which, in clear weather, should be seen for a distance of 12 miles, but is reported to be only visible 8 miles.

Signal station.—At fort William the Commercial Code is used.

The Town, named by the natives Igua, occupies a considerable space to the northward of the castle; and besides long lines of native huts,

* See plan, Cape Coast Castle; scale, $m = 6$ inches, on Admiralty sheet of plans, No. 1,713.

contains some handsome European houses; the Episcopalian church and Wesleyan chapel are the most conspicuous public buildings.

Tabara rock is the native name for the great mass of granite on which the castle stands, and a large solitary stone standing on the beach, about a third of a mile westward of the castle, is known as Tabara's wife. A little further westward there is a small salt-water lagoon, which is only separated from the sea by the ridge of the beach; at the south-west corner of the lagoon there is a little sandy hillock named mount Edgecombe. The number of inhabitants of Cape Coast Castle is about 10,000, almost all of whom are natives.

Communication.—The steamers of the African Steamship Company call here thrice, and those of the British and African Steam Navigation Company twice monthly; there is telegraphic communication, *via* Accra, with all lines.

Landing.—The landing-place is in a small bay under the north-east bastion of the fort, behind some rocks which generally afford much shelter from the sea. During the dry season landing in ordinary boats is frequently practicable.

Hospitals.—There is a public hospital, maintained by Government; also a permanent hospital for the treatment of contagious diseases.

Anchorage.—During the dry season vessels may anchor anywhere off the castle (avoiding a shoal with a depth of 3 fathoms over it, situated nearly 2 cables S.E. of the castle), as the ground is clear of rocks, the bottom generally fine dark sand, with sometimes minute broken shells, and the depth decreases regularly and slowly to the shore; but in the rainy season, when there is usually a long swell, it will be prudent to anchor in 10 fathoms water, with the castle and fort William in line, bearing N.N.W. and about $1\frac{1}{2}$ miles from the castle. The fortifications are coloured red.

An anchorage recommended is in 7 fathoms water with fort Victoria and the church steeple in line, bearing N. by W. $\frac{1}{2}$ W.; here there is said to be less swell than more to the eastward.

In the tornado season, vessels not moored frequently foul their anchors, and it is well to have a long scope of cable out, as sometimes a heavy roller will come in without warning, and, if the vessel is riding short, she is liable to snap the chain.

Tides.—It is high water, full and change, at Cape Coast Castle at 4 h. 30 m.; springs rise 6 feet.

COAST.—The village of Mumford is situated at the foot of the hill which rises above Mumford point, lying E. by N. $\frac{3}{4}$ N., distant half a mile,

* See chart No. 1,713.

from Cape Coast Castle; and at three-quarters of a mile east of Mumford point there is a large granite boulder on the edge of the shore, named by the natives Abu Ketu.

Queen Anne point bears from Cape Coast Castle E. by N. distant $1\frac{3}{4}$ miles; the intermediate coast consists of many small bays and rocky points with rocks close to them, which cause an almost continuous line of breakers along that rugged shore. The point is bold and cliffy, and rises to the hill of Akwon with a village and the ruins of a fort on it. At the western side of the hill the small barred river of Barka terminates; the adjacent land is hilly and covered with trees.

Mori point, on which stood in 1885 a solitary white house, bears E. by N. $\frac{1}{2}$ N., distant $1\frac{1}{4}$ miles from Queen Anne point. In the rocky bay between there are several rocks lying rather more than half a cable off shore, and, on an eminence above the point, fort Nassau, a square building in ruins, and similar to Sekondi fort, is difficult to distinguish, owing to the darkness of the background.

A rock lies 2 cables eastward of the point, showing two black heads, on which the sea breaks; there is a channel with 2 fathoms water inside of it. To the eastward of Mori point there are two barred-up rivulets, the Eper and the Amfur, and from the latter a clean shore, partly sand and partly rock, extends for $1\frac{1}{2}$ miles to the bold commanding point of Anashun.

Briwa rock.—At nearly a mile eastward of Anashun point, and a third of a mile S. by E. from the trading house on an eminence in the village of Briwa, there is a rock which breaks, with a depth of 3 fathoms between it and the shore, and 4 fathoms close to its outer edge.

Gwonkom river.—A little to the eastward of Briwa village there is a small lagoon, and farther on a barred river named the Gwonkom. Between Anashun point and Anamaboe, a distance of 3 miles, the beach is very foul, with rocks extending from it to the distance of a quarter of a mile in some places. Between Gwonkom river and Anamaboe there are several large black rocks close to the beach.

Anamaboe fort.—The fort of Anamaboe, standing in a little cove upon a flat sandy beach is not readily seen, owing to its not being kept white, it is a square building with regular bastions at the angles, and contains good barracks and storehouses, and other buildings for the accommodation of a garrison. There are several white houses forming a village, and a conspicuous church, with a square tower and showing very white, at the back of Anamaboe fort; the hills of Kormantan also serve to point out the place. Anamaboe has a trade of some importance.

Communication.—There is a telegraph station at Anamaboe.

See chart No. 1,359.

Anchorage.—The westernmost of the five hills of Kormantan, in line with Anamaboe fort, bearing N. by W. $\frac{1}{2}$ W., is a good mark for anchoring, as the bottom on that line is of excellent quality, blue mud with sand and shells; the approach to the shore is quite regular from 9 fathoms water at 2 miles distance, to 6 fathoms at one mile; so that a vessel can take any berth according to the season.

Aga point.—At about a mile eastward of Anamaboe is situated Aga point, with a small native town upon it; some ledges of rock extend a quarter of a mile east of the point, and Aga hill rises above it.

Kormantan fort.—A square building, constructed of reddish earth, about 100 feet on each side, with bastions at the angles, and an outwork, rises from a bold rocky base about a mile E.N.E. of Aga point; on the south-west side of the fort there is a tower, 146 feet above high water.

Landing.—On the western side of fort Kormantan, on the slope of the hill, there is a small native village; and on the eastern side a winding path leads to a little sandy bay, which is the usual landing-place. Etsin river, small and barred in the dry season, discharges its waters by two branches during the rains, one into this bay, and the other nearly a mile farther to the eastward.

Kormantan town stands at the corner of a ridge of high ground, on the eastern side of the valley which is drained by Etsin river, at the distance of about a mile from the fort. It is a large native town, with some very tall trees, the tops of which, being 260 feet above high water, may be seen from the anchorage off Cape Coast Castle.

Salt Pond town, the principal commercial centre between Cape Coast and Accra, is situated about 15 miles eastward of Cape Coast Castle; it may be distinguished from some distance by a large red earth building on an eminence to the north of the town.

Communication.—The British and African Company's vessels call fortnightly, and there is a telegraph station at Salt Pond town.

Dispensary.—There is a free dispensary at Salt Pond, maintained by the Government.

Anchorage.—The best anchorage off Salt Pond is in $6\frac{1}{2}$ fathoms water, over hard sand, with the red earth building bearing N. by E., distant one mile.

Great Tree hills.—The country in the vicinity of Anamaboe and Kormantan is diversified with hill and dale, but does not appear to be heavily timbered; there are, however, some remarkably large trees farther to the westward, on a ridge of hills about 4 miles N.N.E. from Cape Coast Castle.

Kormantan hills.—The elevations which will attract the attention of the mariner about this part of the coast, are the five hills of Kormantan, which vary from 410 to 610 feet in height, and lie $2\frac{1}{2}$ miles north of Anamaboe; a group of three hills lies about 2 miles farther to the N.N.E. and 4 or 5 miles to the northward of these is situated a blue ridge, on which there are three hummocks.

Coast.—At Kormantan the character of the coast again changes, turning suddenly to E. by S. $\frac{3}{4}$ S., and preserving an unbroken line of straight sandy beach for 15 miles to the village of Kuntamkweri. In this extent the approach to the coast is clear, without any off-lying rocks, and the soundings are regular, over a bottom of fine sand and broken shells. The coast is very low, and on its margin are situated ten villages, each standing in a dark clump of cocoa-nut trees.

There are also a few streams, of which the Amisa and Nakwa are the largest. The former is said to come from a long distance in the interior, its source being close to that of Busum Prah river, which enters the sea near Chama; in April the current of the Amisa was found to be just strong enough to force a small channel through the sand, not sufficiently wide for a canoe to enter, but it is said to be deep within. Nakwa river, 5 miles farther to the eastward, spread into a lagoon inside the beach in April, but in May it opened a channel and discharged a large volume of water.

At Inuma and Sasra there are salt-water lagoons, and from behind those villages the land begins to rise to a higher elevation. On the bearing of N. by E., distant 3 miles from Nakwa, there is a peaked hill named Brabra Pow, about 430 feet above high water, and the hill lying N.N.E. of Kuntamkweri, which is 380 feet high, is visible from the tower of fort William at Cape Coast Castle. Most of this part of the coast is cleared of trees and covered with long grass.

Tantamkweri point.—Two miles of alternate rock and sand extend from Kuntamkweri to Tantamkweri point, where there is a native village named Tnam; the landing there is difficult. The old castle of Tantamkweri standing on the crest of a rocky hill, a quarter of a mile eastward of the point, has long been abandoned, and is now a complete ruin covered with jungle; it is easily recognised, having, in 1885, a large tree growing apparently in the fort.

Babli point, $1\frac{1}{2}$ miles east of Tantamkweri point, is a large black rock, on each side of which there is a good deal of foul ground and a stagnant lagoon, and at a quarter of a mile inland from the point, the village of Deggu appears on a rising ground near a grove of tall trees. Kwaben hill, $3\frac{1}{4}$ miles N.N.E. of Deggu, is table-topped, 520 feet above high water, and makes an excellent sea mark for this coast; further inland there are

See chart No. 1,359.

four other hills, known by the names of the four cardinal points of the compass.

Gamma.—From Babli point the coast to the eastward is formed by several small sandy bays and points, with some detached rocks about them, but not extending more than three-quarters of a cable from the shore. The town of Gamma stands on the eastern part of a high double point of rock, 3 miles north-east of Babli point, with a lagoon in the valley, three-quarters of a mile westward of the point. At one mile east of Gamma, and 2 cables from the shore, there is a rock which breaks, with $2\frac{1}{2}$ fathoms water close round it.

Shoal.—The SS. *Tibet* (1899), drawing 19 feet water, touched lightly on what is probably a rocky head on a shoal bank extending three-quarters of a mile off shore, with Gamma point bearing N.W. by W. $\frac{1}{4}$ W., distant about 6 cables, and Appam point N.E. $\frac{1}{2}$ E.

APPAM POINT, $2\frac{1}{2}$ miles E.N.E. of Gamma, appears like a small hummock on the eastern side of a saddle-shaped hill, which, rising immediately from the sea, is surrounded by rocks above and under water; these rocks extend nearly half a mile along the coast on either side, and about 2 cables to the eastward.*

On the hummock stands a white ruined fort with a flagstaff; to the westward of the fort and near the beach is a white house; these two objects help to distinguish the place.

Communication.—The steamers of the British and African Company call monthly, and there is a telegraph station at Appam.

Landing.—The bay to the eastward of Appam point is smooth, though shallow, being sheltered by the point and its surrounding rocks; the landing is good and dry when a canoe is employed, but too shoal for ordinary boats. The little river Kotoko has its entrance at the head of the bay, about 2 cables northward of the hummock, but the bar is only passable by canoes; inside the bar the river spreads into a salt-water lagoon.

Wreck.—An American barque, which was burnt, lies sunk in the anchorage off Appam. The wreck, with a depth of about 3 fathoms over the hull, lies in $5\frac{1}{2}$ fathoms water, with Assakri black rocks bearing N. by E. $\frac{1}{2}$ E.; Mumford fort point W. $\frac{3}{4}$ S.; and Appam fort N.W. $\frac{3}{4}$ W., but this position is doubtful.

Tides.—Spring tides rise 4 feet; neaps rise 3 feet.

Rocks.—Eastward of the river Kotoko there is a sandy beach $1\frac{1}{4}$ miles in length, extending as far as the rocky point of Kitchoru; and in the space between there are some detached rocks, which extend nearly half a mile from the shore, with a 2-fathoms channel inside. Two of them are

See chart No. 1,359.

* See plan of Appam on Admiralty chart, Anchorages on the Gold Coast, No. 1,668; scale, $m = 6.0$ inches.

always above water and appear black; they are named by the natives the Assakri.

Eastward of Kitchora point, there is a long ledge of rocks, on which the sea breaks heavily; it is a quarter of a mile in breadth, and fronts the beach for the distance of a mile to the foot of Mamkwadi hill. The natives of Mamkwadi village ply their canoes amongst these breakers with great dexterity, and beach and launch them freely under the shelter they afford.

Mamkwadi hill is bold high land, with a steep ascent from the sea; its highest point at the south-east extreme of the ridge is 670 feet. The Mamkwadi range, the highest point of which is 930 feet above high water, lies in an east and west direction, nearly parallel to, and about 5 miles from, the coast; the hills are covered with vegetation, and the trees on some of them are of large dimensions, forming conspicuous objects for a long distance on either side, and an excellent mark for recognising the different places along the coast.*

At one mile eastward of Mamkwadi hill the little river of Munni forces a shallow passage through the sand, but in the rainy season it is the outlet of a large body of water.

Winneba point, low and rocky, bears E. $\frac{1}{2}$ N., distant 7 miles from Appam point; the town of Winneba stands on the beach of a small bay on the eastern side of the point, and above the town are situated the ruins of a fort. Two whitewashed trading-houses on the point, are easily seen when approaching from the westward. The neighbouring country is rather low, but undulating, and with more brushwood than forest.

Communication.—The steamers of the British and African Company call monthly, and there is a telegraph station at Winneba.

Dispensary.—There is a free dispensary maintained by the Government.

Landing.—At low water the landing here is good for canoes, being sheltered by the reefs extending from the point, which are then uncovered but at high water it is very difficult.

Ainsu river.—This river falls into the sea at a mile eastward of Winneba point, and being somewhat sheltered by that point, as well as by the adjacent rocks, its mouth is always open.

Coast.—From Ainsu river a straight sandy beach extends E. $\frac{1}{4}$ S. for a distance of $6\frac{1}{2}$ miles to Meredith point, when the coast again becomes rocky, and turns more to the northward. In this space the coast is low, but behind it the land rises into gentle hills, the highest of which, mount

See chart No. 1,359.

* See view on chart No. 1,359.

Senia, is about 307 feet above high water ; these hills are generally bare of trees, but covered with low stunted bushes.

Long hill, with a grove on its summit, rises to a height of 550 feet, and bears N. by W. $\frac{3}{4}$ W., distant 6 miles from Meredith point.

At about 10 miles, N. by E. $\frac{1}{2}$ E., from the same point, a hill with two remarkable hummocks is 770 feet above high water ; its local name is mount Appra, but to seamen it is generally known as the Paps.*

The Camel's hump, bearing N. by W., distant 6 miles from the Paps, and 16 miles inland, is a still higher range, extending 6 miles in an E.N.E. and W.S.W. direction ; near the centre of the range, one part of it, which assumes the shape of a camel's hump, attains nearly to the height of 1,200 feet above high water. All the hills seem to rise out of an extensive plain.

BARAKO POINT, three-quarters of a mile E.N.E. of Meredith point, is moderately high and rugged, of a dirty red colour, and on an eminence above it stands the native town of Senia, as well as the abandoned fort of Barako, which is in a state of rapid decay and not easily seen.

Senia is large and much cleaner than most of the towns on this coast, with three or four European white houses. It is said that vast numbers of large baboons infest the neighbourhood of this place, and commit great depredations.

Coast.—From Barako point to the eastward, the coast is formed by small sandy bays and rocky points, at the base of which lie a few rocks ; the land rises to a ridge of moderate height, which lies in a parallel line to the coast as far as Fetta bay.

Fetta point, situated $2\frac{2}{3}$ miles north-eastward of Barako point, is sandy on the western side, but to the eastward a rocky cliff turns at right angles to the coast, and forms a bay half a mile across, at the head of which the village of Fetta stands upon a rising ground, with the little river Kaku winding round its foot. When closed in the dry season, this river spreads itself into a lagoon beneath the town.

The village of Fetta consists of 40 or 50 mud huts, with a population of about 400, who appear to live principally on fish ; the ground near is very little cultivated.

Off Fetta the water is rather shoal, there being a depth of 4 fathoms at a mile from the shore.

Supplies.—There is no good water in the place, and other supplies are scarce, but a few fish can be procured by hauling the seine in the river, and turtle are occasionally caught.

* See Admiralty chart.—Africa, West coast, Sheet XIV., Barako to cape St. Paul, No. 1,360 ; scale, $m = 0.22$ mile.

Landing.—The landing place is the sandy beach at the foot of the cliff under the village, the rocks off Fetta point breaking the force of the swell. Under ordinary circumstances landing is practicable for a whale boat.

COAST.—At half a mile north-eastward of Fetta point a reef projects about a quarter of a mile from the shore; the remainder of the coast is clean as far as Nianyano village, which stands among a grove of high trees, $\frac{1}{4}$ miles eastward of this reef; at the foot of the village a little river passes from behind a small rocky point into the sea. A few rocks lie close off the mouth of the river, and to the eastward of it a long beach, but slightly curved and everywhere safe of approach, extends for 12 miles to Accra.

Country.—The country round Fetta is more open than at Elmina or Cape Coast Castle. At about 2 miles east of Nianyano village the remarkable hill of Dampa will be observed close to the shore; its name among the old traders on this coast was the Cook's loaf. This hill is the western termination of a range of high land, lying in a north-east and south-west direction, and which, though it appears to have many breaks in its continuity, steadily increases in height from the coast.

At 2 miles from Dampa hill this range is 600 feet above high water; at 17 miles, 1,350 feet; and at 22 miles, 1,560 feet; from whence to the north-east it falls to 1,430 feet, but everywhere appears to be covered with forest. Westward of this range, and about 18 miles N. by E. $\frac{1}{4}$ E. from Dampa hill, and N. by W. $\frac{5}{8}$ W., distant about 20 miles from Accra, there is a conspicuous hill known as Akem peak, apparently isolated, and about 1,000 feet above high water.

The part of the range lying 2 miles N.N.E. of Dampa hill, is a table-land, and round its eastern extreme Sekum river winds down to the sea, which it enters through an open mouth; the surf, however, was too high at the time of the survey for a boat to enter. The stream is supposed to be the eastern boundary of the Fanti country.

ACCRA.—Accra point is formed by a large rock, with its southern extremity (on which Jamestown fort is built), rising only 36 feet above high water. The fort is nearly square in shape, about 145 feet each way, with regular bastions, and has a tall flagstaff. Shoals extend in an E. by S. $\frac{1}{2}$ S. direction for a distance of $4\frac{1}{2}$ cables from Jamestown fort, and in a southerly direction the 3-fathoms line is 3 cables from it.*

LIGHT.—A building, 18 feet in height and painted red, stands on the western bastion of Jamestown fort; it exhibits from an elevation of

See chart No. 1360.

* See plan Accra on Admiralty chart. Anchorages on the Gold Coast, No. 1,668; scale, $m = 6.0$ inches.

50 feet above high water a *fixed white* light, that should be visible, in clear weather, from a distance of 10 miles.

Town.—The town extending north-east and north-west from the fort consists of several narrow streets of native dwellings and some good houses belonging to the English merchants. Westward of the town there are some brackish pools of water, which stagnate after the rainy season.

There is a constant communication between Accra and the Ashantis, who bring from the interior the greater part of the gold which is exported from this place ; the country, so far as the high range of hills recently mentioned, is a fine open plain with a light soil, covered with shrubs and not much heavy timber. The distant hills are covered with dense forest, but the valleys between them are described as fertile and beautiful.

On the eastern side of Jamestown fort, between 600 and 700 yards from it are the ruins of the fort of Crevecoeur. It stands upon a rocky cliff about 50 feet above high water, and appears to have been of an octagonal form, with a large enclosed space adjoining it, which was probably the slave yard.

At 2 miles eastward of Jamestown fort, the castle of Christiansborg stands upon a rocky point, about 35 feet above high water, its principal part approaches the form of a square, of about 190 feet in the side. On each side of it the beach forms a small sandy bay, and in front there are a few ledges of rock, on which the sea breaks heavily.

There is a good road between the castle and Accra, with trees on each side, which render it an agreeable walk or drive, and midway is Victoriaborg, where are the public offices, post office, &c.

The native town, which lies northward of the castle, has not a very clean appearance ; to the westward of it there is a martello tower on a small sandy eminence, and also a black wooden windmill. Farther inland there are a few detached dwelling-houses.

Zahrtman mount, a solitary hill in the plain, 540 feet above high water, bears N. by E., distant 6 miles from Christiansborg.

Communication.—The British and African Steam Navigation Company's steamers call weekly, and African Steamship Company's steamers three times a month. Telegraphic communications with all lines.

Supplies.—Cattle, fruit, vegetables, water, and other supplies may be obtained at Accra. Fish may be caught in abundance at the anchorage. There is a contract for provisions here.

Landing.—A few detached rocks lie round the base of Jamestown fort and the landing-place is on a small sandy beach, scarcely sheltered by those rocks. The surf is so high, and it requires so much skill, as well as

local experience, to pass through these dangers with success, that ordinary boats should never attempt to land; but the natives in their canoes have, from long practice, acquired the habit of landing and embarking with ease and safety. There is also a landing place near the slaughter-house, about 4 cables east of Jamestown fort.

Signals.—Ships, at the anchorage, can communicate by the Commercial Code with Jamestown fort or the Government house flagstaff at Christiansborg. By hoisting the red ensign at the fore the Government surf boat will come out to ships of war anchored in the road.

Time signal.—A time signal, consisting of a flag and gun, is made from the Telegraph Company's office. The flag is dropped at 11h. 0m. 0s. Accra mean time. Greenwich time is received daily, Sundays excepted, at 10h. 0m. 0s. a.m. from London by Post Office Chronograph, but, being re-transmitted through several stations, is not exact.

Hospitals.—There is a public hospital maintained by the Government; a permanent hospital for the treatment of contagious diseases; and a military hospital for the Haussa Constabulary.

At Aburi, 26 miles from Accra, and elevated 1,400 feet above high water, is a sanatorium, which is open to patients from Her Majesty's ships; it is in telegraphic communication with Accra, the food and water are good, and the temperature ranges from 60° to 75° Fahr.

Submarine telegraph cables.—Cables from Sierra Leone, Grand Bassam, Kotonu, and Lagos are landed near Accra.

Buoy.—A can buoy, surmounted by a staff and cage, marking the telegraph cables, is moored S.E. by S., about 8 cables from Jamestown fort; vessels are cautioned not to anchor near the line.

Anchorage.—At a mile south of Accra there will be found a depth of 5 fathoms; at $1\frac{1}{2}$ miles, 7 fathoms; and at 2 miles, 8 to 9 fathoms. During the dry season, vessels may anchor in 5 or 6 fathoms, but during the rains it will be prudent not to approach nearer than 8 fathoms. Vessels should not anchor east of a line of the church and quarry bearing N. by W. $\frac{1}{2}$ W.

Earthquakes.—In 1863 the town was destroyed by earthquakes, and on 13th August 1883 several severe shocks were experienced.

Depths off shore.—The soundings along the whole coast from Cape Coast Castle to Accra are regular, shoaling gradually towards the shore, up to 3 fathoms, which is as close as boats can generally approach the surf. The quality of the bottom is fine dark grey sand, with broken

shells, and sometimes mud. By keeping outside the 7-fathoms line all dangers will be avoided.

Tides.—On the coast between Accra and Volta river it is high water, full and change, at about 4h. 46m.; springs rise 6 feet; neaps 3 feet.

COAST.—From Christiansborg a sandy beach, with a few rocky patches upon it, extends east for a distance of 2 miles to the village of Labadi, which stands on a little rising ground in the centre of a grove of high trees, nearly half a mile from the beach. At 3 miles farther east there is a large native town named Tassi, which has a large white house fronting the centre of the town, also one or two white houses on either side, rendering it easy of recognition. The land in its vicinity is flat for several miles inland, and covered with grass and a few clumps of low trees. To the westward of the town may be seen the remains of fort Augustenborg.

Shoal.—A shoal, on which there is a depth of 3 fathoms, lies E. $\frac{7}{8}$ S., distant $3\frac{3}{4}$ miles from Accra point; it is nearly a mile from the nearest shore at Labadi.

Coast.—Eastward of Tassi the coast line is an indented sandy beach with a few rocks off the projecting points, and ledges at considerable intervals apart, but neither projecting more than a quarter of a mile. The country is open, with occasional trees or groves, instead of continuous forests, and the native villages are smaller and not so numerous than those to the westward.

Little Ningo.—This village, lying 2 miles east of Tassi, stands on a rising ground, at a third of a mile from the shore; and Temma, situated 5 miles farther east, has a similar position, with a green slope to a bay on its eastern side. On that slope there is a large, round-headed, dark tree, standing conspicuously alone, and helping to identify the place.

Greenwich rock.—In the space between Tassi and Temma villages, about $1\frac{1}{2}$ miles west of the latter, there is a small black rock, on the eastern extremity of a ledge which fronts the shore; it is detached from the coast nearly 300 yards, and lies on the meridian of Greenwich.

Grove point.—At $1\frac{1}{2}$ miles east of Temma village the beach forms a point, from which a reef projects to the southward; and $1\frac{1}{2}$ miles east of this is situated Grove point, with a similar reef projecting to the eastward.

Vernon bank.—A narrow spit, extends 12 miles in an E. $\frac{3}{4}$ S. direction from Grove point having an angle of about $1\frac{1}{2}$ points, with the general trend of the shore. Its formation is very irregular, some casts of

the lead showing sand, others gravel, stones, and narrow ledges of rock. The average depth on it is between 5 and 6 fathoms, and on the shoalest part, which is 2 miles south-east of Poni, there are 4 fathoms water.

There is a depth of 10 fathoms close to on its southern side, and on the northern side 8 or 9 fathoms, with regular soundings from thence to the shore, over a bottom of brown sand with minute broken shells. It is believed that there is no danger on any part of this bank, but vessels would do well not to approach it within a depth of 12 or 13 fathoms.

Poni, a town situated in a bay $1\frac{3}{4}$ miles eastward of Grove point on rising ground a quarter of a mile from the beach, can only with difficulty be made out through a grove of trees. East of Poni is a conspicuous tree standing by itself on top of rising ground close to the shore. Two ledges of rocks lie at the foot of the hill, but they are of small extent.

Landing.—The usual landing-place for Poni is on the beach close northward of Grove point, the reefs off which afford some little shelter.

Prampram.—Eastward of Poni, distant $3\frac{1}{2}$ miles, the town of Prampram stands, like Poni, near the summit of a low hill, and is three-quarters of a mile from the beach. It may be recognised in approaching from the eastward, by three white houses, about half-way between the town of Prampram and the landing-place. The ruins of fort Vernon are near the beach.

Communication.—The British and African Steam Navigation Company's steamers call fortnightly, and there is a telegraph station at Prampram.

Supplies are fairly plentiful, beef and mutton, live stock occasionally, also turtle. Various kinds of game can also be shot in the neighbourhood.

Landing.—The landing-place is about two-thirds of a mile south-eastward of the upper town, on a clear part of the beach, between two rocky shoals, which extend a mile on each side, and on which the sea breaks heavily. The white house of the District Commissioner, with a flagstaff, and a white store, both of which are on the beach, sufficiently indicate the landing-place. Landing is only practicable in surf boats.

Anchorage.—H.M.S. *Racer* in August 1883, anchored at three-quarters of a mile from the shore in $6\frac{1}{2}$ fathoms water, with the Commissioner's house bearing North.

Ningo river.—Great Ningo bears E. by N., distant $4\frac{1}{2}$ miles from fort Vernon; and the coast between is formed by a beach, fronted by two rocky shoals.

Ningo river, though small, is said to be always open, and navigable for canoes, whenever the heavy surf which rolls in upon the bar allows them access; its entrance is very narrow, between two low sandy points. On the eastern point stands fort Fredensborg, which shows as a large white ruin among a grove of tall trees.

Country.—The country immediately inland of the part of the coast east of Tassi, and to within a mile of Ningo river, is an extensive plain, of pleasing appearance, partly open and partly diversified with groves of large trees, but covered neither by heavy forest nor unhealthy jungle. It contains many hills of various elevation, amongst which there is a picturesque group with a singular outline, rising to the height of 950 feet above high water, about 12 miles inland, named by the natives the Krobo hills.

Other hills will be seen to the north-east, one of which from its form was named the Abbey dome; and at 18 miles north from the mouth of Ningo river, the well-known peak of Ningo Grande attains the height of 1,431 feet; this peak is an excellent landmark when approaching the coast between Accra and cape St. Paul from the southward.

Coast.—For nearly 4 miles eastward of Ningo river the beach is fringed by a broad ledge of rocks, over which a small river discharges, and being protected by them, its mouth is probably always open. The edge of this ledge is nearly “steep-to,” there being a depth of 4 fathoms as close to it as a boat can approach; the heavy surf rolls over it incessantly. These rocks are the last seen upon this coast when proceeding to the eastward.

From the above ledge of rocks to the entrance of Volta river, there is an uninterrupted beach of 26 miles in length, and so slightly curved as not to recede more than 2 miles from the straight E. by S. $\frac{1}{4}$ S. course between its west and east extremes. For 5 miles east of the ledge a low clay cliff rises immediately from the beach, but it then falls into a ridge of sand with a few bushes upon it.

This ridge is not more than 12 or 15 feet in height, and continues for 13 miles to Ukko village, separating, throughout that space, the sea from the great salt-water lagoon and swamps which are produced by the overflowing of the Volta. From the mast-head the whole face of the country appears a wooded morass so far as the eye can see; and the surface of the lagoon is broken by large tracts of swamps, some of which are covered with grass, and others by jungle, with here and there a few high trees.

Ukko.—The village of Ukko is about 250 yards from the beach, near the eastern extremity of the lagoon, and surrounded by cocoa-nut trees, which, as there are no others near it on either side, give it the appearance of an island when seen from a distance. At a quarter of a mile eastward of

Ukko, the shore, though intersected by swamps, is again covered with verdure, and thick groves of palm trees mixed with jungle, which extend to the banks of the Volta. There appeared to be other villages in the bush, as well as on the beach.

Addafoa, about $1\frac{3}{4}$ miles westward of the entrance to the river Volta, is a native village with some European merchants' houses; the village, built in a hollow, is easily recognised by the mission house, a flat-roofed building standing on the western extremity of the settlement; there is also a church and post office.*

In 1896 the wreck of a steamer was lying on the beach a little westward of Addafoa.

Communication.—The British and African Company's steamers call fortnightly, and there is telegraphic communication.

Dispensary.—There is a free dispensary, which is maintained by Government.

Anchorage.—There is a fair anchorage off Addafoa, a good berth is in $6\frac{1}{2}$ or 7 fathoms water, over sand, with Basle Mission house (a long white building near the beach), bearing North. It is not prudent to anchor nearer the shore, as the water shoals quickly and at times the swell is heavy.

Landing is very bad, the surf boatmen often refusing to go out.

VOLTA RIVER.—This river is said to come from a long distance in the interior, and separating the great kingdoms of Ashanti and Dahomey, passes near the base of Ningo Grande peak, on the north side, at 45 miles from the sea; from thence it takes a south-easterly direction towards the coast, and enters the sea between two low spits of sand, 18 miles westward of cape St. Paul.

Sandy island, rather more than a mile in length in a north and south direction, has some villages on its southern part, but the northern portion is thick bush and trees, it is situated between the two entrance spits, and the river then expands into a wide basin with several islands, most of which are covered with thick bushes and trees with some patches of cultivated land. Kennedy island, about 3 miles in length, in a north and south direction and thickly wooded, lies on the western side of the above-mentioned basin.

On the eastern bank, about a mile north of the entrance points, there is a dark grove, which makes like a bluff headland; at 2 miles to the eastward of this grove there is another in the form of a conical hill, and on the western side of the river there are three other high groves, the

* See Admiralty plan.—Volta river, No. 397; scale, $m=0\cdot5$ of an inch; and plan of entrance to Volta river on same plan; scale, $m=2\cdot5$ inches.

trees in the immediate neighbourhood of Volta river attaining an unusual height.

The river begins to rise early in June, and commences to fall about the middle of October, being at its lowest about March and highest in September.*

Big Adda is a large town on the right bank of the Volta, about 4 miles from its mouth, and near it is situated the fort of **Kongensteen**.

The principal merchants reside at a town locally known as **Riverside**, situated on the right bank of the Volta, at $1\frac{3}{4}$ miles within the western entrance; the produce brought down the river is landed at **Riverside** and conveyed across to **Addafoa**, on the sea coast, for shipment.

Foa is situated on the bank of the river close to **Riverside** and is marked by a large clump of palm trees, here it is proposed to construct a wharf.

Entrance.—When coming from the west the mouth of the river is known by a temple and a large building of two stories, which is also seen from the east, but is then, on certain bearings, hidden by the tall cocoa-nut trees. The mouth of the river is clearly seen when bearing N.W., the entrance being between **Dolben's point** on the west, and the west extreme of **Sandy island** on the east side; from **Dolben's point** for about half a mile to the westward there is a separate clump of trees, which appears like an island, when the point bears N. $\frac{1}{2}$ W.

Bar.—The bar, which is about a cable in width, lies between the points of two tongues of very heavy breakers, the western extending three quarters of a mile south of **Dolben's point**; the eastern nearly the same distance south-south-west of the south point of **Sandy island**.

There is a channel, with a depth of 5 feet, between **Sandy island** and **Palm point**, but the shoal south-east of **Sandy island** is extending, and between **Palm point** and the south-east extreme of **Sandy island**, the surf is generally too heavy for a boat to cross.

A depth of 9 feet at low water, spring tides, was found on the bar in 1897.

Buoy.—A bell-buoy is moored off the bar, on the western side of the line of entrance. See Caution; buoyage, page 33.

Directions.—Two marks, erected on the western side of **Sandy island**, in line, bearing N. by E. $\frac{1}{2}$ E., lead across the bar, but no vessel should attempt to cross, except in fine weather, and with the assistance of a pilot, as the bar is liable to shift. The bar should only be attempted

See chart No. 397.

* In December 1887, the Commander of the French man-of-war *Dumont d'Urville* remarked that the gray waters of the Volta extended to the extremity of cape St. Paul, where they suddenly ceased.

on the flood; the best time to cross being one hour before high water. In crossing the bar, the set of the tidal streams should be carefully watched; the flood sets over the western breakers, and the ebb over the eastern.

Tides.—It is high water, full and change, at Riverside, at 4 h. 20 m.; springs rise 4 feet in June. At the mouth of the river (in February) springs rise from 5 to 6 feet, neaps 3 feet.

The range of tide is affected by the state of the river; when at its lowest (about March) the range at springs is sometimes as much as 6 feet, as the river rises the strength of the stream increases, and the tides have not so much effect; when at its highest (in September and October) the range at Riverside is reduced to one foot or less.

Upper river.—At Amidika, 50 miles within the entrance, and where the stream is one-third of a mile wide, the difference of level between the high and low state of the river is about 45 feet; at the entrance, owing to the large expanse over which the waters are spread, the difference is not more than 4 or 5 feet.

Greatest draught.—A vessel drawing 6 feet water can ascend to Amidika from July until November; during the remainder of the year a vessel of that draught would experience difficulty in proceeding to Duffo island (40 miles within the entrance), and could not ascend above that point.

CAUTION.—When passing the entrance of Volta river, allowance should be made for the indraught on the flood; the soundings should not be reduced to less than 12 fathoms, as in 10 fathoms a vessel would almost be within the influence of the breakers.*

H.M.S. Curacoa, in 1889, at 6 miles off the mouth of the Volta, found as little as 10 fathoms water.

Coast.—From the mouth of Volta river the shore, which continues to be a straight clean beach, takes an E. by S. $\frac{1}{4}$ S. direction, and for a distance of 7 miles the land is covered with a dense forest, principally of fan-palms.

Atoka, a town once a notorious slave mart, is situated 8 miles eastward of Volta river, and half a mile from the beach. There is a kind of gap in the uniform line of forest at Atoka where there are a few straggling trees.

Current.—Between Cape Coast Castle and Whyda, during July and August, the current has been observed to be as irregular, both in strength and direction, setting to the westward occasionally with a velocity of half a knot an hour.

* See charts Nos. 397, 1,360.

CHAPTER XIII.

CAPE ST. PAUL TO CAPE FORMOSO, OR THE BIGHT OF BENIN.

 VARIATION IN 1900.

Lagos - - 15° 40' W. | Cape Formoso - 15° 00' W.

Decreasing about $4\frac{1}{3}'$ annually.

BIGHT OF BENIN.—General remarks.—The bight of Benin is bounded by cape St. Paul on the west and cape Formoso on the east, the latter bears from the former S.E. by E., distant 320 miles. From that line, at two-thirds of the distance from cape St. Paul, the curve of the shore recedes 95 miles to the north-eastward, where, at the head of the Bight, is the entrance of Ajimo or Odi vista.*

The length of coast of the Bight is about 420 miles, forming a long monotonous range of beach, so uniformly low and flat that not a single inland eminence is visible from the offing; indeed the elevation of the ground, above high water, in some places is scarcely 4 feet, and seldom exceeds 10, and even the most prominent clumps of trees do not rise to a height of more than 60 feet.

Character of coast.—The coast from cape St. Paul to cape Formoso is composed of sand and mud; sand of a bright yellow tint along the western two-thirds of the shore line and sand and mud along the eastern side of the Bight, as well as on the margin of the estuaries of the numerous rivers. Whatever gentle undulations may be discerned on the shore, they will prove to be only sand-hills thinly covered with a loamy crust, and densely clothed with weeds and brushwood.

Here and there single palms and cocoa-nut trees may be seen, or a group of huts with white conical roofs standing out in relief to the dense thicket, or jungle, background, while, on the receding plain, clusters of stately trees, when seen from the distance of 5 or 6 miles, present the appearance of green cliffs.

Near Kitta the trees are high and form large and distinct groups, gradually blending into a continuous line as far as Agweh, where the coast trees terminate, and the high beach is only here and there dotted with them; between Great Popo and Whyda the beach is very bare, only occasionally rising into green hummocks.

* See Admiralty charts:—River Gambia to cape Lopez and Anno Bom, including the Bight of Biafra, No. 594; scale, $d = 1\cdot3$ inches; Badagri to cape Formoso, No. 2,768*a*; scale, $m = 0\cdot1$ inch, and Cape Coast Castle to Badagri, No. 2,768*b*; scale, $m = 0\cdot1$ inch.

From an offing of 12 miles, and an elevation of 13 feet, the whole shore dips below the horizon; so that throughout the bight of Benin, there is no object which at that distance from the shore would enable a vessel to make out any particular station, or identify any one position. At 8 miles from the shore the aspect is entirely different from that at 4 miles, so that, until familiarised with the appearance of every place, one station can be recognised only by tracking it from another, assisted by the Admiralty chart.

Windward or western shore.—Jungle, with groups of trees, covers the whole of the windward or westward arm of the Bight, interspersed with numerous villages and detached huts; throughout this long extent of coast, Lagos river is the one permanent opening or outfall for the lagoon waters, but there are several partial breaks in the sand-hills, through which the lagoons pour their swollen floods during the wet season; these breaks produce straight vistas, which appear like river openings, but across them the sand is heaped so compactly as to preclude any outfall during the rest of the year.

Leeward or south-eastern shore.—The distinctive character of the leeward or south-eastern arm of the Bight is a continuous dense mass of trees, no longer fringed by a bright sandy beach, but growing on the muddy high-water margin of the sea; the many rivers and creeks which form the Delta of the Niger river are also a peculiar feature here.

On this part of the coast there are very few groups of huts, or remarkable objects by which a vessel may identify her position; but it contains thirteen river-mouths, each possessing sufficient diversity of feature to be recognised. Much vegetable matter and silt is discharged from these at every ebb tide, which discolour the blue ocean water with a filthy scum of a brown colour and sickening odour, for the distance of several miles from the coast.

Discoloured water.—Frequently the discharge from the rivers, on the leeward side of the Bight, consists of a scum nearly 3 feet deep, resembling the lees of an oil cask, and from its deep brown colour so contrasts with the ocean blue as to present a remarkably defined and frothy margin having all the appearance of a shoal. On approaching it a stranger would be much inclined to tack or anchor; but if the soundings be attended to, he will be saved much unnecessary trouble, and when crossing its edge he will find that, though its onward motion would sweep away a boat, it has no effect on a vessel of moderate draught.

Lagoon outfalls.—This discoloration of water, during the rainy season, extends sometimes as far westward as Gadomi and Whyda, and to a distance of ten miles from the shore; while in-shore the outfall of the lagoons give the sea a light-green tint. This lagoon water breaks out

See charts Nos. 2,768a and 2,768b.

through openings in the beach during the rainy season, beginning with the month of April, and lasting until October. These outfalls, from Great Popo to the eastward, are all, except the permanent opening of Lagos, barred by sand between October and April, leaving no other indication, of their positions than the remarkable vistas through the wooded belt which lines the shore.

Depths off shore.—The soundings along the windward portion of the Bight may be classed in the following zones:—at one mile from the beach there is a depth of 8 fathoms, fine light-brown sand, extending as far eastward as Palma village; at a distance of 3 miles from the coast a depth of 10 fathoms is found with similar bottom; and at 6 miles from the beach, 12 fathoms over a similar description of sand. At that latter distance from the shore the sandy bottom changes into olive-coloured and black mud with broken shells, and the water rapidly deepens to 200 fathoms at the edge of the bank, which, though only 6 miles south of cape St. Paul, lies 18 miles from the shore on the meridian of Lagos.

The average width of the bank of soundings, to the 100-fathoms line, is about 15 miles along the Windward arm.

The unceasing deposit from the scum, poured out from the numerous rivers on the south-eastern arm of the Bight, accounts for the much increased breadth of the bank of soundings, the 100-fathoms line being found at an average distance of about 30 miles from the coast.

This broad bank of soundings affords a useful warning to the mariner when approaching the south-east part of the Bight, which is skirted with muddy shallows to such a distance, that the surf on the coast is not heard when in shoal water; along the western arm a vessel under sail may stand in to a depth of 8 fathoms.

CAUTION.—Even in the western arm, however, the lead should always assist the look-out, or the navigator might unexpectedly find his vessel within the influence of the coast swell and rollers, the action of which is sometimes experienced when three-quarters of a mile from the beach. The tendency of the swell to set a vessel to leeward should be allowed for at the rate of half a knot an hour, when shaping courses at night, or in hazy weather by day.

Even steam vessels ought not to shoal the soundings below 8 fathoms when on the windward part of the Bight, for unless their engines are occasionally stopped, the roar of the surf will not be heard in time, though audible long before the foam can be seen in foggy weather. If there be no particular motive for hugging the shore at night along the windward coast, the best rule, for preserving a 4 or 5 miles offing, is to keep in a depth of 12 fathoms.

Anchorage.—Excellent holding ground is afforded throughout the whole of the bight of Benin, from close in-shore out to a depth of 15 fathoms, which will be found at about 7 miles off the windward coast, and 12 miles from the leeward coast. The bottom is throughout of stiff black mud with broken shells covered by sand, and is well adapted for working the stream anchor with a bower cable, as the stream chain might not sustain the strain of the irregular swell, which, occasionally, assumes the form of rollers.

Outside the depths of 15 and 20 fathoms, the bottom is composed of so soft a compound of olive-coloured mud, broken shells, and decayed vegetable matter, as to require a bower anchor. In-shore, although the lead arming may indicate nothing but sand (which covers the bottom to the depth of a few inches), yet from cape St. Paul to Avons deep, the anchor will instantly bury itself up to the crown in mud.

Off-shore anchorage.—Anchoring anywhere in the bight of Benin must be prompted by necessity and not from any hope of tranquillity; for as the vessel lies more or less obliquely to the swell, according to the strength of the current, so unceasing heavy rolling is the sure result.

If requisite, however, for the purposes of transporting stores between vessels, choose a 12-miles offing at least; and, if consistent with the purpose in view, select the windward arm of the Bight, and as far westward towards cape St. Paul as possible, for the swell there is not so heavy, and the climate is less disagreeable than it is when farther eastward. In fact, several dry sunny days together, during the rainy season, may be enjoyed to the westward of Lagos, while it is incessantly raining to leeward.

Directions for anchoring.—Along the leeward arm of the Bight a vessel should anchor at 9 miles off the coast in depths of from 10 to 12 fathoms, not only to avoid shoal water, but also on account of the heavy ground swell that is perpetually rolling in; with the land not sighted, the vessel's head off shore, and the soundings decreasing below 12 fathoms, it will be advisable to anchor; more especially if supposed to be opposite any of the river entrances, as the in-draught of the flood tide extends for distances of 4 and 5 miles from the shore.

Landing.—Canoes.—It should be borne in mind that, however practicable the surf may occasionally appear, nothing ought to induce an attempt to land anywhere between cape St. Paul and the termination of sandy beach about 5 miles eastward of Ajimo, in other 'than local canoes, and even they require much skill in handling and the assistance of extra hands to receive and haul them up as well as to launch them. The signal gun, with ensign at the fore, will be at once understood by the natives as

a signal for a canoe, though, perhaps, tardily obeyed. The different factories will supply surf boats. The part of the canoes reserved for passengers is at their bow, where 3 or 4 feet of housing is formed to keep out the sea when thrusting through the surf in the operation of launching, and it affords the only chance of keeping anything dry. More than two persons cannot well occupy this limited space, and other passengers must sit on the thwarts between the double-banked paddlers, who themselves sit obliquely on the gunwale with their faces towards the bow; the padroon or coxswain steers with a paddle. In disembarking, the passenger may sit or stand in the fore part of the canoe, in order to be ready to jump on shore quickly, lest he be swept out by the succeeding surge.

In embarking the canoe is made ready with the prow outwards, and hauled up on the beach, the crew being ranged on either side reaching down to the thwarts so as to lift the boat out of the sand-dock, as well as to launch her, which they begin to do with the assistance of the beach-men, as soon as the second of three heavy waves has broken.

The steersman now watches with experienced eye for the following swell, when, with energetic exclamations and gestures, the canoe is floated off on the expended wave; each man jumping into his place with his paddle so simultaneously and expertly as not to overbalance the boat.

The head is then dexterously kept to the sea, but the canoe is not propelled forward till the steersman again gives the word; and sometimes a long interval is occupied in watching the swell and in moving a little backward, forward, or perhaps sideways, which is cleverly done by a sculling motion of the paddles without altering the direction of the head, which must be kept towards the surf.

Many anxious minutes are passed in this way, till the state of the outer swell seems all at once to justify a dash, and then, with great urging at one moment and expertly checking at another, the buoyant little boat is passed from ridge to ridge.

It is always prudent to have the ship's boat waiting at the back of the surf, and it is advisable to head-up in a small cask such things as it may be desirable to pass dry through the surf.

Very few accidents occur to these canoes when freighted with passengers only, but with cargo they often capsize, especially when loaded with such top-weight as casks of palm oil and oxen, or when landing crates and dry goods in cases.

Watering.—It is not advisable for cruisers to obtain wood and water anywhere in the Bight: nor can there under ordinary circumstances be any occasion to do so, as Fernando Po and Princes Islands are within three days' sail to the southward. In cases of necessity, however, the natives will bring off water, and merchant vessels generally so provide themselves.

See charts Nos. 2,768a and 2,768b.

With attention, an ample quantity of rain-water may be saved, during two-thirds of the year, for cooking and washing purposes.

Smokes.—The land is frequently obscured by exhalations, locally termed smokes, which in the dry season, especially from November to May, prevail throughout the entire Bight, but with less perplexing effects on the windward side where the bright sandy beach, with its fringe of surf, is easily seen through the haze, or the breakers are heard in time to warn the mariner of his proximity to the shore.

The smokes last usually for about three hours after sunrise, giving place at about 10 a.m. to the sea breeze.

Tides.—The beach indicates a vertical range of tide of about 4 or 5 feet, but the surf is so heavy and incessant on the shore, and the swell so constant in the offing, that it precludes actual measurement of the rise of the tides on the windward coast; along the leeward arm, where the water is smooth within the river bars, the tidal establishment at each river mouth has been obtained. The navigator should therefore compute when to allow for the influence of either ebb or flood streams, which generally extends to a radius of from 6 to 9 miles from the mouths of these rivers, more especially if intending to send a boat across any of the bars.

Tidal streams.—The velocity of the flood stream is much less than that of the ebb, as might naturally be expected from the vast outfalls of the freshes being added to the discharge of tidal water, the combined effects of which are expended over a considerable radius, with a velocity of 3 knots an hour at the mouth of a river, and 1 knot an hour in the offing; at half ebb a volume of turbid, brownish water, upon which are floating up-rooted trees, bushes, leaves and jungle, is discharged.

CAPE ST. PAUL.—From Atoka the coast line bends gradually to the northward, towards cape St. Paul; at 3 miles farther east, the coast having turned more to the northward, is the village of Weh, which is difficult to be seen; from here the coast sweeps round rapidly to the N.N.E. for 5 miles to the town of Kitta. The curve of the shore being so gentle, it is difficult to say what part of it should be named cape St. Paul, that name is, however, usually applied to the coast near Weh, in latitude $5^{\circ} 50' N.$, longitude $6^{\circ} 58' 30'' E.$ *

From Atoka to Kitta, or in other words the whole sea face of cape St. Paul, is only a narrow ridge or barrier of sand, which separates the sea from that great eastern lagoon, already mentioned as being connected with the river Volta, receiving its overflowing water, and extending to the eastward for many miles. On this narrow strip of sand there are several native towns.

* See Admiralty chart.—Africa, West coast, Sheet XV., cape St. Paul to Porto Novo, No. 1860; scale, $m = 0.2$ inch.

After passing the mission house at Addafoa, and proceeding to the eastward at about 2 miles distant from the shore, the most prominent object is a clump of trees on cape St. Paul, and, when abreast this, two very prominent whitewashed factories may be seen which are at the eastern extremity of the town of Kitta; the flagstaff of the fort, situated to the left of the factories, should then open out. Coming from the eastward the greater part of the town of Kitta is obscured by a thick growth of trees.

Weh.—At this village canoe communication may be effected with the shore, and plenty of stock obtained. The position of the village may be known by a fan-like cluster of trees, with a remarkable clump of trees, named Tegbeh, situated two miles to the northward and three-quarters of a mile inland. A little east of this clump there is a small cluster of palms, and about half a mile east of this a small village, which is the only one seen in rounding the cape.

Anchorage.—Vessels desirous of communicating with the shore at Weh may anchor at any required distance from it, as there are no off-lying dangers, the soundings are regular, with the bottom of fine white sand near the beach, and mixed with shells and mud farther out.

Depths off shore.—With cape St. Paul bearing N.N.W. the bank of soundings to the 100-fathoms line extends 6 miles from the land; and on the meridian of the cape it is very flat, dropping suddenly, at a distance of 9 miles, from 22 to 200 fathoms.

Jella Koffi or Jellu-koffi, situated 3 miles north-eastward of cape St. Paul, or midway between that cape and Kitta, when made from the eastward, appears as several islands, the western of them being the clump of trees among which the huts and houses are built. The position of Jella Koffi is known by two large posts, painted white, which stand at the foot of a cutting into the wood and mark the entrance to the village.

Supplies.—Cattle and poultry are abundant in the vicinity of cape St. Paul, and may be procured without difficulty from the natives at Weh, Jella Koffi, and Kitta.

Landing.—The surf is much too high along the beach to employ ordinary boats for this purpose, but at Kitta the landing is easy at times.

The Naval Contractor lives at Jella Koffi, the station, near which he resides, being situated about 2 miles south of Kitta fort; it consists of two white houses and a flagstaff.

Anchorage.—A large vessel might anchor in $6\frac{3}{4}$ fathoms water over sand, with Kitta fort bearing N. $\frac{1}{2}$ E., and Jella Koffi flagstaff W.N.W.

At night care should be taken not to mistake the lights, in two or three houses situated a mile northward of Jella Koffi, for those of the village.

Kitta.—From Jella Koffi the shore trends about N.N.E. for $2\frac{3}{4}$ miles to Kitta, where there is a fort, having a dwelling-house built on it; coming from the southward nothing can be seen of the fort, and when abreast of it only the dwelling-house, which is white, and the flagstaff are visible, the fort itself being hidden by trees; just north of it there is a magazine, which is a yellow building with a white-roofed sentry box near it.

Four large houses on the beach, the southern with a very white roof and a conical roof to its porch serve to identify this place; the northernmost house, which is a hospital, has also a white conical roof when seen from the eastward.

From Kitta to a mile westward of the white house,* which stands at the foot of a wooded eminence with very gradual slopes, the beach is almost clear of trees. A number of huts lie on the southern side of the fort, and there are several narrow streets with little picketed enclosures, some of which appear to be neatly kept; the edge of the lagoon is within 350 yards of the fort to the north-westward.

Communication.—The British and African Company's steamers call fortnightly, and there is a telegraph station at Kitta.

Supplies.—The natives at Kitta are extremely civil, and will procure supplies if required.

Hospital.—The Government maintain a public hospital at Kitta.

Anchorage.—To facilitate communication with Kitta a vessel should anchor about half a mile from the shore, in 7 fathoms water; otherwise in a depth of 10 fathoms, at 2 miles off, with the fort bearing N.W.

H.M.S. *Fox*, in 1897, anchored in $6\frac{3}{4}$ fathoms off Kitta, with the fort bearing N.W. $\frac{3}{4}$ W., and the white house North. Owing to the trend of the coast, vessels at this anchorage lie head to the swell.

CAUTION.—It must be borne in mind, while at anchor at Kitta or on this part of the coast, that tornadoes often blow on shore.

Vessels intending to stay should not anchor in less than 6 fathoms water, as the rollers may come in unexpectedly and sometimes heavily.

Depths off shore.—The 100-fathoms line of soundings lies 9 miles off Kitta on a S.S.E. bearing, the soundings abruptly dropping from 38 fathoms, over black mud, to 108 fathoms.

COAST.—The coast for upwards of 100 miles between Kitta and Porto Novo is low and flat, presenting to the view a line of green brush-wood with occasional large clumps of palm trees, and a yellow sandy beach on which the surf breaks heavily.

From Kitta the coast line trends in a straight line N.E. $\frac{1}{2}$ E. for $8\frac{1}{2}$ miles to Elmina Chica, with, like the shore previously described, clean ground

See chart No. 1,860.

* Almost entirely obscured by trees and apparently in ruins; Remark Book, Navigating Officer, H.M.S. *Magpie*, 1896.

in a depth of 6 fathoms, at half a mile from the surf. The villages of Akwiji and Blukus are situated among large clumps of trees, at 3 and $4\frac{1}{2}$ miles respectively, north-east of Kitta.

The banks of the lagoon, previously described as being connected with the Volta river, are seen extending to the eastward, and the country on the northern side is described by the natives as being very productive. The inhabitants of the long intervening ridge, between the lagoon and the ocean, derive all their supplies of provisions from thence, which occasions a considerable canoe traffic between the opposite shores.

Elmina Chica, once a slave station, is 4 miles from Blukus; a high clump of trees helps to mark its position. From Elmina Chica, the coast, with the same general appearance, bends gently eastward for 5 miles to Adaffia, a village situated on the beach, where there is a single white house nearly hidden amongst trees, which serves to distinguish it from Dano, the next coast village.

Factories of various nationalities are springing up between Kitta and Little Popo.

Landing.—Neither at Elmina Chica, nor at the intermediate places between it and Kitta, will the signal for a canoe be attended to with any certainty.

Depths off shore.—Between Adaffia and Kitta, a depth of 8 fathoms, over fine brown sand, is found at half a mile off shore, and the 100-fathoms line is 13 miles distant, dropping abruptly from a depth of 43 fathoms, over black mud. Patches of gulf weed may be seen in this vicinity drifting to the eastward.

Dano, about $1\frac{1}{2}$ miles eastward of Adaffia, has four white houses, the most prominent being the German factory, and a Government house has been built behind some trees; there is also a small Custom house, and each of these establishments has a flagstaff.

Communication.—There is a telegraph station at Dano.

Aflao, also known as Porura, where there are three white houses and a store with a red roof, and both English and German trading stations, is about 4 miles eastward of Dano.

Boundary.—A flagstaff has been erected for the purpose of marking the boundary between the English and German protectorate, its approximate position is in lat. $6^{\circ} 6' 30''$ N. and long. $1^{\circ} 14' 0''$ E. Near the flagstaff are a few native huts, built close to the beach.

National Flag.—All the places near the shore which are under the German Protectorate hoist the German flag, and all the flagstaffs are painted in alternate bands of black and white.

Beh Beach, or Lumeh, about 3 miles eastward of Afiao, is the largest place between Accra and Lagos, having several English and German factories as well as being the residence of the German Commissioner. The Catholic Mission, situated at the east end of the town, is a large building with a small tower on the centre of the roof.

Porto Seguro.—From Dano the beach is nearly straight for 26 miles in an easterly direction to Little Popo, and midway between them is the trading port of Bagida; a range of bushy sand-hills, with tall isolated trees a mile apart, extends 18 miles east of Dano. At 3 miles farther east, just within high-water mark, is situated the village of Porto Seguro or Gomaluta; on the east side of this village is a white house with a red roof, and on the west side a red-roofed white house with a flagstaff close to it; these are the only buildings which are conspicuous from seaward; palms grow in numbers at the back of the village.*

Lagoons.—Avon waters, an extensive lagoon lying north of Porto Seguro, is also locally known as Hako lagoon; it is said to form a junction with Volta river at a considerable distance inland, the country around abounds in palm oil, cotton, indigo, and beeswax.

Between Porto Seguro and Gadomi a narrow lagoon extends for about 50 miles, being separated from the coast by a narrow sandy ridge; several streams fall into this lagoon on the northern side, and it has an outlet eastward of Great Popo.

The depth in this lagoon during the dry season is only about 2 feet, but in the rainy season it increases to several fathoms.

Supplies.—On this part of the coast, Jella Koffi is considered the best place for poultry, Adaffia and Porto Seguro for sheep, and Little Popo for fish, vegetables, and fruit.

Anchorage may be obtained, in 10 fathoms water, at one mile south of the eastern extremity of the bush of Porto Seguro.

Little Popo.—At about 2 miles east of Porto Seguro there is a clump of trees and a native village, and about 4 miles further east Little Popo presents an imposing front of beach storehouses and signal poles, one of which marks the residence of the native chief. A creek of the contiguous lagoon comes in an oblique direction from the north-east to within 120 yards of the sea-beach, dividing the town (which is a quarter of a mile inland) from the whitewashed storehouses and dwellings that range along the high-water mark for the space of a mile, so that to proceed to the town, either the head of the bight must be rounded, or the creek, which is 14 feet deep and 300 yards wide, must be crossed.

See chart No. 1860.

* See views on chart No. 1860.

Little Popo is one of the largest places along this part of the coast, and is rendered conspicuous by its large white two-storied factories on the east side ; it may be readily distinguished from Porto Seguro and Agweh from being situated on a strip of beach, almost entirely free from trees except at its western part, where there is a remarkably thick palm wood, in which is situated the native town ; it may also be known by the extensive clumps of trees inland near it.*

Communication.—The British and African Company's steamers call here monthly, and there is a telegraph station.

Landing is bad in the rainy season, there being two separate lines of surf to pass through.

Anchorage.—A convenient berth for anchoring may be taken with the eastern extreme of the stores on the beach bearing N. by E. $\frac{1}{2}$ E. in 8 fathoms water, over fine sand, about a mile off the heavy surf.

CAUTION.—A night should not be passed closer in than a mile from the shore, and even at that distance, on any part of this coast, a second anchor should be ready in case of a roller snapping the cable when there is no land breeze.

Current.—In the vicinity of Little Popo the gulf weed is swept in by the swell to within a mile of the shore, and lies obliquely to the set of the current which is to the eastward except in the harmattan season.

Depths off shore.—The 100-fathoms line lies 13 miles off Little Popo in a south direction, the depth increasing suddenly to more than 200 fathoms.

Agweh.—From Little Popo, the coast trends E. $\frac{3}{4}$ S. for 4 miles to another native village named Agweh, with two conspicuous buildings, the western a white house with a large verandah, the eastern a Roman Catholic church, coloured yellow, with a square tower at the western end.

Anchorage.—H.M.S. *Danae* anchored in 10 $\frac{1}{4}$ fathoms water, at 2 miles off Agweh, with Little Popo bearing N.W. $\frac{1}{4}$ W., and Agweh bearing N.N.E.

Bae, situated about 8 $\frac{1}{2}$ miles east of Agweh, has one long native built shed and a few huts, but no European establishments.

Great Popo.—The shore for 11 miles east of Agweh is bushy, with scattered palm trees, so far as Great Popo, eastward of which the sand ridge is broken through by the occasional outfall of the lagoon.

Several dark dome-shaped trees, situated 2 or 3 miles eastward of Agweh, are the most conspicuous objects on this part of the coast, when seen from a distance of 7 or 8 miles in the offing.

See chart No. 1,860.

* See views on chart No. 1,860.

There are several factories at Great Popo, but they are not conspicuous from the offing, the native town lying at the back of the sand ridge, and extending a mile along the shore to the westward of the white houses. An elevation of the ground, rising to the height of about 200 feet, and surmounted by a few trees, stands 6 miles to the eastward, and is commonly known as mount Pulloi or mount Palaver.

The outlet of the lagoon in 1893 was situated about 8 miles east of Great Popo, and the channel appeared to be impassable for boats.

Great Popo may be readily distinguished, when near, by a large house which stands in the centre of the beach and has a red roof and white pillars supporting a verandah; there are also two stores with red roofs situated a short distance westward of the station.

Whyda.—The coast from Great Popo for 13 miles in an E. $\frac{1}{2}$ S. direction resumes its former appearance so far as Whyda, the next principal trading station. This place may be known, when 3 miles to the westward of it, by two dark clumps of trees, named the Brothers, and when made from the south-westward two white factories are conspicuous.*

The Beach station of Whyda appears from seaward to consist of half a dozen storehouses, sheds, and huts, all of which, when on a northerly bearing, make out clear of the western fall of a high grove of trees in the background. In the centre of the town on the beach there is a dark-coloured house with a white roof and a flagstaff near it.

The lagoon town of Whyda lies 3 miles from the Beach station, on the northern shore of the lagoon, which here approaches to within half a mile of the beach, and is only a quarter of a mile wide and 4 feet deep. The lagoon town, built on slightly rising ground, is estimated to contain a population of about 12,000; residents are considered to be more liable to intermittent fever than at other places on the windward arm of the Bight.

Communication.—The British and African Company's steamers call here monthly.

Supplies of live stock, vegetables, fruit, and, if desired, small casks of water can be obtained here; the surf is heavier than to the westward.

Anchorage, convenient for communication with the shore, may be obtained one mile off Whyda in 7 fathoms water, over brown sand, with the highest storehouse bearing North.

Depths off shore.—The 100-fathoms line lies 12 miles from the shore, the soundings dropping into deep water from a depth of 48 fathoms, over black mud, with 13 fathoms midway between that depth and the coast. The discharge of the freshes at Great Popo gives a greenish tint to the sea that sometimes extends to this place.

See chart No. 1,860.

* *See view on chart No. 1,860.*

Gadomi or Jackin.—The coast extends E. $\frac{1}{2}$ S. for 15 miles in a direct line from Whyda to Gadomi, which slightly projects : 6 miles east of Whyda, a solitary white house is conspicuous. There are three solitary palms on the shore about 3 miles to the westward of Gadomi, at a distance of about half a mile apart. No huts or canoes are visible from the offing. At Gadomi there are four houses and two flagstuffs. The village extends about half a mile along the beach.

Shoal.—A shoal with $5\frac{1}{2}$ fathoms water over it, lies one mile off the coast, 10 miles east of Whyda.

Kotonu or Appi.—With a gentle bend to the northward the same character of coasts continues for 6 miles eastward of Gadomi to Kotonu, which may be recognised by a vista through the flat jungle on the shore, which opens when bearing about N. by E. : nearly midway between Gadomi and Kotonu is the western boundary of the French possessions.

Kotonu is a larger village than Gadomi, and there are generally several vessels loading with palm oil here, while at Gadomi there is seldom more than one vessel at a time ; at Kotonu there were, in 1888, three conspicuous factories.

Pier.—From the shore a well-constructed iron pier extends about 312 yards seaward ; it has a large pier-head, on which are five cranes and landing stairs on the east side.

LIGHT.—*Proposed.*

Communication.—The British and African Company's steamers call monthly, there is a regular service from Marseilles by the Marseilles Steam Navigation Company and small steam vessels run between Kotonu and Porto Novo ; telegraphic communication with all lines.

Supplies.—Bullocks may be obtained.

Anchorage.—Vessels of war anchor south-west, and merchant vessels about 2 cables south, of the pier.

Submarine telegraph cables.—The telegraph cables from St. Thomas and Accra are both landed here.

Depths off shore.—The 100-fathoms line recedes here to 17 miles from the beach, the depth increasing suddenly from a depth of 66 fathoms, over black mud, to more than 200 fathoms.

Porto Novo, in French territory, and containing a population of about 10,000, is situated on the north side of Porto Novo lagoon, which is the name given to the western portion of Victoria lagoon ; it is about 14 miles east-north-east of Kotonu, about 6 miles from the coast and 48 miles westward of Lagos.

The Trading station can be recognised on the western side by two houses with red roofs, having a white house with a flagstaff between them; on the eastern side there is a single white house.*

Anchorage.—There is good anchorage in 8 fathoms water, over sand and mud, at 2 miles S. by W. of the station.

Depths off shore.—The 100-fathoms line of soundings is 16 miles from the coast, the soundings deepening abruptly from a depth of 44 fathoms, over black mud.

Boundary.—The eastern boundary of French Dahomey is about 5 miles east of Porto Novo.

Victoria lagoon.—The Victoria lagoon, for a distance of 9 miles west from its junction with Lagos river, has a general depth of from 12 to 18 feet; westward of this the channel is narrow and intricate for a distance of 7 miles, but after passing these narrows the bottom is clean in the centre, with a uniform depth of 10 to 30 feet up to the town of Porto Novo. West of the narrows the water is perfectly fresh, but not wholesome. Fish abound, mullet are frequently caught weighing 3 or 4 pounds, and oysters and other shell fish are excellent and plentiful.

Westward of the entrance to Ajarra creek the lagoon expands in width to about $1\frac{1}{4}$ miles, and is known as Porto Novo lagoon. The shores of this lagoon are low and uniform in appearance, being composed of bog and floating grass closely matted together; the trees in the vicinity of the shores are generally small.

Okpara or Wemeh river.—This stream, entered about $2\frac{1}{2}$ miles west of Porto Novo, affords water communication between Lagos and the landing place for Abomey, the capital of Dahomey. In December 1876 it was found to have a depth of from 5 to 12 feet in it between Porto Novo lagoon and the town of Kesamu situated 18 miles north of it; at Kesamu the river was about 125 yards wide and no current was perceptible.

In September 1876, the Colonial steam-vessel *Eko*, drawing $4\frac{1}{2}$ feet, ascended Okpara river as far as Dugba, a distance of 55 miles from Porto Novo lagoon and 23 miles south-east of Abomey. The downward current at this season was found to be very strong.

It is estimated that the difference of level of Okpara river between wet and dry seasons is from 6 to 8 feet.

Toche channel.—Immediately south of the entrance to the Okpara river the lagoon contracts in width and forms Toche channel, a narrow strait communicating with Denham waters.

* See Admiralty chart.—Africa, West coast, Sheet XVI., Porto Novo to Lekki, No. 1861; scale, $m=0\cdot25$ inches; also Badagri to cape Formoso, No. 2768a; scale, $m=0\cdot1$ inch.

In December 1876 there was only a depth of 3 feet in Toche channel, and a tidal rise of 6 inches was observed; during December the water in the lagoon is generally lower than at any other season.

Denham waters.—Westward of Toche channel the lagoon expands considerably in breadth and increases in depth. This part of these inland waters is known as Denham waters.

Numerous towns, built on piles, are situated on this lagoon, which in September 1876 had a general depth in it of from 8 to 10 feet. In the dry season there are several shoals with less than 3 feet water on them.

The river Zunu or Eso enters the lagoon at its northern extremity; this river is only navigable by canoes.

At the south-western part of Denham waters is a creek, leading to the native town of Kotonu.

COAST.—With the same description of foreground, but with continuous groves of high trees in the distance, and occasional clumps in the intervening plain, the coast is nearly straight from the landing place of Porto Novo for about 6 miles in an E. by S. direction to the boundary between the English and French protectorates, and then for about 9 miles in the same direction to the landing-place of Badagri.

From a vessel, only two or three white huts of the town of Badagri can be seen in a N.N.W. or N.W. direction, on all other bearings it is covered by brushwood and palm trees. There is a pyramidal clump of bushy trees immediately to the eastward, known as mount Badagri; there are also two saddle-shaped clumps of trees and two groups of huts at 3 and 6 miles to the westward of Badagri landing-place.

Badagri, containing a population of 15,000, is on the north side of Victoria lagoon, 33 miles westward of Lagos, and a mile from the landing-place, out of sight of either the anchorage or beach.

Westward of Badagri the Victoria lagoon on its northern side receives the waters of Addo or Yewa and Ajarra rivers. These rivers are free and open to the inhabitants of the English and French Protectorates.

A vessel, drawing 9 feet water, may generally reach Badagri from Lagos through the lagoon, which is a quarter of a mile wide at Badagri and 16 feet deep; the intervening ridge of sand between it and the beach is about a mile across.

In 1890 H.M.S. *Alecto*, having lightened to a draught of 8 feet water on an even keel, proceeded up the Victoria lagoon to the Ajarra creek, a distance of about 10 miles north-west of Badagri, to determine the boundary; the least water obtained in the lagoon being 10 feet. The anchorage off Badagri, in $3\frac{1}{4}$ fathoms water, afforded ample swinging room,

See chart No. 1,861.

and at the anchorage off the Ajarra creek the lagoon was half a mile in breadth with deep water right across.

Anchorage.—Convenient anchorage may be obtained off Badagri landing-place in 8 fathoms water, over mud and shells, with the landing-place bearing N. by E., distant about a mile. The signal for a canoe will be promptly answered here, and every attention paid to applications for stock and refreshments.

Current.—Off Badagri, in the wet season, the current occasionally attains a velocity of $2\frac{1}{2}$ knots an hour, being influenced in direction by the wind; between Badagri and Lagos the current has been observed to have a set towards the shore.

COAST.—The coast line eastward of Badagri presents the same appearance as that to the westward, and has similar soundings off it for a distance of 9 miles to Wuru, which may be recognised by a grove in the background, surmounted by two umbrella-shaped palm trees, also, by a remarkable red house.

On the coast between Badagri and Wuru is situated one village, and some rows of salt pans will also be seen.

From Wuru the coast line trends about E. by S. $\frac{1}{2}$ S., gently curving both in and out for 24 miles to the opening of Lagos river.

The western half of the distance from Wuru to Lagos is very flat and bare, having but few trees and no huts upon it; but the eastern half shows a densely-wooded background that rises from the margin of the lagoon.

At about 13 miles west of Lagos river there is a conspicuous high knoll, and at about 3 miles west of that river, close to the beach, there is a large white house which makes a good landmark.

There are two low, bushy, and sandy points at the entrance of Lagos river with woods in the distance, and two clumps of trees, somewhat inland, at 4 and at 5 miles eastward of the entrance.

LAGOS RIVER is the first permanent break in the coast line to the eastward of cape St. Paul, and through it the periodic accumulation of the freshes in the lagoons finds a vent to the sea, occasioning a surf of no ordinary kind upon the bar. The river is situated at the southern part of the extensive lagoon known as Lagos lagoon, and the principal channel passes west of Eko or Lagos island.*

The entrance to the river is between Bruce point on the western, and Greslie point on the eastern, side, which latter is a low sandy continuation of the mainland, on the eastern part of which is Victoria settlement, and a flagstaff and signal station. A number of vessels are usually at anchor outside the bar.†

See chart No. 1,861.

* See Admiralty chart:—Lagos river, No. 2,812; scale, $m=7\cdot5$ inches.

† See view on chart No. 1,861.

LIGHT.—About 3 cables north-west of Beecroft point, and half a cable W. by N. $\frac{1}{2}$ N. from the Sanitarium, on the west side of the entrance, a cylindrical lighthouse 90 feet in height, and painted white with a red lantern, exhibits at an elevation of 86 feet above high water a *fixed white* light which should be visible, in clear weather, from a distance of 15 miles between the bearings of E. $\frac{1}{2}$ S. through north to W. by N. $\frac{1}{3}$ N.*

Sanitarium.—The Government Sanitarium is on the western shore, about half a mile north-west of Beecroft point, where the coast begins to trend towards the entrance of the river.

Lagos town occupies a river frontage of about $1\frac{1}{4}$ miles, has an area of $3\frac{3}{4}$ square miles, and is an important settlement, the population of which was about 40,000 in 1897; the native portion of the town is much congested, and can only be described as a huge cess-pit. The Government House, Colonial hospital, and Telegraph office are situated at the south, and the Custom house and Post office at the north extreme of the town, and there are several wharves, affording facilities for loading and unloading cargo.

Communication by steam every week with Liverpool and ports on the Gold Coast and south-west coast of Africa; once a month with Hamburg, and frequent communication with the United States and Brazil, by sailing vessels.

Local steamers of light draught ply by inland waters with Porto Novo.

There is a railway to Otta and Abeokuta, which opens up an important palm oil district, and gives access to a region containing an unlimited quantity of stone. Lagos island is connected with the mainland by two bridges; one with a span of about 2,000 feet, between Lagos and Iddo island; the other, having a length of about 900 feet, connecting Iddo with Ebute Metta: the railway terminus is on Iddo island.

Lagos is connected by telegraph with the Gold Coast, Sierra Leone, and Europe, and with Kotonu, Gaboon, and Loanda *via* Accra; also with the Niger, Bonny, and Brass rivers direct.

Coal and supplies.—Coals are supplied in flats that carry about 4 tons, but as they cannot always be obtained it is preferable to go alongside the pier, which is an iron structure with wooden fenders, and good bollards for hawsers; it is advisable to use an anchor as an off fast. There are usually in stock about 1,000 tons; any vessel able to cross the bar can go alongside a wharf to coal.

Supplies and provisions of all kinds are abundant, and the well water at Lagos is very good, the best being obtained on the mainland opposite the church.

* See chart No. 2,812.

* The wreck of a steamer lies about 3 cables north of Beecroft point.

Repairs.—There is a workshop at which small repairs to machinery are effected for local and Government steamers.

Hospital.—Masters, mates, seamen, and krumen are treated, when ill, in the Colonial Government Hospital at a fixed rate of payment.

Quarantine.—A quarantine ordinance may, if occasion requires it, be put into force; the quarantine ground is situated about half a mile north of Wilmot point.

Submarine telegraph cables.—Two telegraph cables are landed near the brickworks south-eastward of the town of Lagos; they are laid on the eastern side of the river till below Wilmot point, thence across the bar, and in a S.W. by S. direction seaward; at the distance of about 2 miles from the bar, the cables separate, one trending gradually south-eastward to Brass river, the other westward to Accra.

Trade.—In 1897 the value of the imports amounted to 770,510*l.*, of which 574,937*l.* represented imports from the United Kingdom. Mahogany formed a new article of export; india-rubber and palm oil had somewhat decreased.

Signals.—If, on arrival off the river, a vessel wishes to communicate with the shore, such intention should be made known by the International code to the signal station on the beach, together with the name of the ship. The river steamers stationed in the outer anchorage, which fly the signal P at the foremast on leaving for the town, should also be informed. A small steam-vessel is sent out to any vessel of war firing a gun and hoisting a red ensign.

Outer anchorage.—Merchant vessels usually anchor in from 9 to 10 fathoms water, with the lighthouse bearing about N.W. by N.; and the Quoin clump* N.E. by E.; the best anchorage is said to be in 9 fathoms water with the lighthouse bearing N.N.W. $\frac{3}{4}$ W., and the signal station N. $\frac{1}{2}$ E.; this anchorage is used by the local steamers, and here a vessel will be out of the disturbed water, caused by the stream of the river meeting the heavy swell that always rolls into Lagos road, and which renders it an uncomfortable, if not dangerous, anchorage.

Vessels should not anchor in Lagos road with the lighthouse bearing between N. by E. and N.E. $\frac{1}{4}$ E., to avoid fouling the telegraph cables.

Rollers.—The rollers are heaviest from June to August.

Bar.—The bar breakers extend for nearly $1\frac{1}{2}$ miles in a S.E. direction from the lighthouse, the intermediate space to the north-east, from the Bar breakers to the entrance, is occupied by detached banks and breakers, having channels between them.

See chart No. 2,812.

* "Has no resemblance to a quoin until bearing east of N.N.E." Remark book, Navigating Officer, H.M.S. *Fox*, 1897.

The entire breadth of the channel at the entrance is barely half a mile, and through it the lagoon pours out, about half ebb, such a volume of surface scum, of a deep brown tint and of a sickening odour, as to spread to a distance of 3 miles from the coast; the edge of this discoloured water is marked by a well-defined margin, as it rolls forward on the deep blue water of the offing.

During the rainy season, the discoloration of water produced by the discharge from Lagos lagoon is perceptible when at a distance of from 7 to 10 miles eastward of Lagos.

At all times there is a break across the bar, being worse during the rainy season (June-September), when sometimes steam-vessels cannot cross. The bar is very treacherous owing to its continual shifting; the depth is also variable, altering as much as 3 feet in one week. During the year the depth on the bar varies from 5 to 9 feet at low water.

At the latter end of October 1893 the bar was very variable, ships, drawing $7\frac{1}{2}$ feet water, being unable to get out for three days of one week.

Greatest draught.—The limit of draught of vessels crossing the bar is regulated from time to time to meet the constant changes; in 1895 it was 9 feet for steam-vessels both in and out; in 1896, on account of a new channel opening, it was increased to $10\frac{1}{2}$ feet in and 10 feet out. No vessel should attempt to cross the bar without a local pilot, as although the channel is buoyed, the positions of the buoys are continually changed, and any leading marks on shore are not reliable.

H.M. ships should not engage a pilot until first communicating with the government of the colony. As a rule the Harbour Master pilots all H.M. ships into port, and it is as well, if possible, to inform him by telegraph, of the probable date of arrival, but, as there is no Government steamer to bring him out, his services are only available on the days that the bar steamers are running. The qualified pilots are mostly masters and mates of the bar steamers.

There are two colonial and four merchant steam-vessels that ply over the bar, but they are only of small power.

From the dangerous nature of the bar at Lagos river entrance, only the English and German river steamers should be used for landing.

Beacon.—There is a beacon on a point about three-quarters of a mile south-west from Bruce point.

Buoys.—There is generally a fairway buoy moored off the bar in from 6 to 7 fathoms water, and the channel is also marked, in places, by buoys, but as these are continually shifted to meet the changes in the channel, no positions can be given, nor should any dependence be placed on them. *See Caution; buoyage, page 33.*

Signals.—The following bar signals (Commercial code) are shown from a flagstaff near to the tide gauge, which is under the supervision of the beach signalman on the east entrance point:—

Commencement of rise, N flag hoisted half mast; high water, N flag mast-headed and kept there until the water begins to fall.

For bar boats { Smooth bar, Flag S.
Bad „ „ B.

Rules for navigating Lagos river.—In thick or foggy weather, every steam-vessel proceeding outwards will give one blast of the steam-whistle at intervals. Every steam-vessel entering the port will give two blasts at intervals.

In all cases where two or more steam or sailing vessels are making for the bar, the vessel, or vessels, bound for the port, being at or near the Fairway buoy, shall stop and allow the outward-bound vessel, or vessels, to proceed if such outward-bound vessel, or vessels, is or are between Bruce point and the bar; when such outward-bound vessel, or vessels, shall be on the Lagos side of Bruce point, and the inward-bound vessel, or vessels, at or near the Fairway buoy, then such outward-bound vessel shall stop and allow the inward vessel, or vessels, to proceed.

Directions.—The Middle channel along the north-east side of the Bar breakers is not used.

The straight but very narrow channel right in from seaward is to the westward of the Bar breakers, but a pilot should be employed; in 1898 its direction was about N. by W. $\frac{1}{2}$ W. A flag, on a moveable staff, on Beecroft point in line with the lighthouse leads over the bar, after which the direction of the channel is shown by the buoys on the banks, inside the bar, which are continually shifting.*

Anchorage may be obtained abreast the town of Lagos in from 12 to 22 feet water; a good berth is in a depth of 21 feet, off the Harbour Master's flagstaff, with Christ's church tower bearing N. $\frac{3}{4}$ W. and the Baptist church tower E. by N. $\frac{3}{4}$ N.

Boat entrance.—Should it be necessary to enter the river in a boat, a suitable opportunity must be waited for; this will be soon apparent (in the fine season) by the sand-bank becoming dry; then wait till it is nearly covered again, when it will be certain that the flood is making, then pull through, keeping just outside the rollers and close to the beach, passing within a few yards of Greslie point. This is the best and only passage that can be used by boats (tide permitting) throughout the year.

See chart No. 2812.

*A plan of the Bar and channels will be kept at the Harbour Master's office for inspection of pilots during office hours. W. C. Speeding, Harbour Master, Lagos, 22nd October 1888.

The western passage is only available for boats and canoes during the dry season or in very fine weather. When the sea breeze blows strongly, the sea breaks right across it.

Lagos lagoon extends about 10 miles in a N.N.E. direction from Lagos island, where it terminates in Ikoradu bay, which receives the waters of the river Ogun or Abeokuta.*

The Ogun river has been examined for a distance of 32 miles in a direct line from its junction with Lagos lagoon to the town of Aro. The breadth of the river varies from 30 to 100 yards, and the banks are generally low.

At Aro, in November, the depth in the channel was 2 feet, and at 8 miles above that town the river, even in the wet season, becomes impassable. A rapid downward current was experienced in the river, which is only navigable by boats.

The town of Abeokuta is situated about 4 miles N.N.E. from Aro.

Kradu water.—At the distance of 9 miles E.N.E. from Lagos island, a narrow channel, obstructed by Palaver islands, connects Lagos lagoon with Kradu water, which is a long narrow lagoon extending 27 miles eastward from Palaver islands to the native town of Epeh, situate on its northern shore.

In February 1864, H.M.S. *Investigator*, drawing 5 feet water, proceeded from Lagos to Epeh, finding a depth of only 5 feet in the narrow channel off Palaver islands.

Depths off shore.—On a S.S.W. bearing, from Lagos bar, the 100-fathoms line of soundings lies 18 miles from the shore, the depth increasing suddenly from 70 fathoms, over black mud, to more than 200 fathoms, with a depth of 29 fathoms and an occasional overfall at $9\frac{1}{2}$ miles from the coast; the 10-fathoms line approaches within 2 miles of the shore.

Tides.—It is high water, full and change, at Lagos bar at about 5 h. 0 m.; springs rise 3 feet; neaps rise 2 feet; neap range one foot. Springs rise 2 feet at the Consulate wharf.

Tidal streams.—The ebb stream makes down the river beneath the surface about 3 hours before the stream on the surface turns. The flood stream makes, but is not perceptible till within an hour or an hour and a half of high water; then it runs with great rapidity, as much as a boat can pull against. Within the river the rise of tide in the fine season is not more than one foot; during the rains the river is said to be swollen nearly 3 feet. When the ebb stream makes, the rush is so great that large masses of the banks are swept away, sometimes carrying men and cattle with them.

See chart No. 1861.

* See charts Nos. 1,861, 2,768A

COAST.—The coast immediately eastward of Lagos resumes its usual characteristics. Okun Beju, a native village near the quoin-shaped clump of trees, lies 7 miles distant in an east-south-east direction.*

Jakna.—From Okun Beju village the shore, trending to the eastward, is nearly straight, and presents nothing to view but a ridge of dense jungle for 12 miles, at which distance from the village there is a group of palm trees, resembling in shape a fan, and then several isolated trees, with one village, 6 miles eastward of which is situated Jakna, a place showing about half a dozen huts in a grove of palms. Jakna is the northernmost part of the bight of Benin, the windward arm of which begins there to recede to the southward, and trends in an east-south-east direction for a distance of 6 miles, to Palma village.

Between Jakna and Palma there are several small villages.

Palma may be identified by five huts, with palm trees at equal distances apart, situated at the eastern gables of each of the four eastern huts, and by three remarkable palm trees at a quarter of a mile eastward of the village, the middle tree being about half the height of the other two, and the whole group standing out in strong relief.

Avons deep.—The regularity in the bank of soundings, at 30 miles east of Lagos, is interrupted, south of Palma village, by a remarkable submarine feature known as Avons deep, in which the depth of water suddenly increases at the outer part from 70 fathoms to more than 200 fathoms, and at the inner part from 40 fathoms to more than 200 fathoms.

The centre of this remarkable submarine valley is situated in lat. $6^{\circ} 10' N.$, long. $4^{\circ} 00' E.$, at which position the 100-fathoms margins of the bank of soundings are 8 miles apart, and from whence the deep water trends in a northerly direction for 10 miles, the 100-fathoms edge of soundings on either side gradually approaching each other.

The northern part of Avons deep is about 7 miles from the shore, bearing S.W. by S. from the village of Palma.

There is no overfall, nor anything on the surface to indicate the existence of this singular conformation at the bottom; nor is there any opening in the adjacent coast, or any apparent change in its character. The prudent navigator, however, should be upon his guard when in its neighbourhood, for if approaching the shore at nightfall, or in hazy weather, in dependence on the lead, and intending to be close in at daylight, he might be fatally deceived by a cast with no bottom in this deep, imagining his vessel outside the bank, instead of within 6 or 7 miles

See chart No. 1,861.

* *See views on chart No. 1,861.*

of the beach. In some cases, however, this deep, like the Bottomless pit to the westward, may be of material service to the seaman at night, by giving him a fresh departure.

Lekki lagoon, a shallow sheet of water, several miles in extent, is connected with the town of Epeh at the eastern end of Kradu water by a channel 9 miles long; and with the western end of Kradu water, a distance of 25 miles in a straight line, by Omu creek. The town of Lekki is in the southern part of the lagoon, on the northern side of the narrow ridge which separates the lagoon from the sea, at about $1\frac{1}{2}$ miles from Shoroko at the outer entrance of Lekki vista. From Lekki the inland water communication extends through creeks far to the eastward.

COAST.—From Palma village the general direction of the coast line is E.S.E. for 36 miles to the termination of the sandy beach; the western 21 miles showing a dark undulating bushy foreground, and a distant and paler coloured background of trees, which afford a striking contrast. The next 9 miles of coast is very flat, though bushy, and with no groves in the background; the remaining 6 miles has the back as well as foreground features.*

Mobido, a village with four huts, is situated on the shore 3 miles eastward of Palma; a single hut stands 4 miles farther east; and 3 miles beyond that, and altogether 10 miles east of Palma, is situated, at Lekki, the western of three remarkable vistas, with a village named Shoroko, and a group of palm trees. These vistas or lagoon entrances lie 5 and 12 miles apart, and appear open only when abreast of them; they are each about a quarter of a mile wide at the beach, and they cross the island of Kuramo at right angles.

There is a native village at 5 miles from Shoroko; then the entrance to Otolu vista at one mile farther. Ikegu village, where there is a flag-staff, lies 2 miles east of Otolu vista, and from thence the sandy beach on which are a few huts, extends 11 miles to Ajimo (Odi vista), the eastern of the three.

At 5 miles eastward of Ajimo stands a village, with two conspicuous palm trees; and a quarter of a mile farther east an abrupt and remarkable change from sand to mud occurs in the nature of the coast, the dry soil, palm trees, and brushwood being succeeded by swamps and mangroves. With the alteration in the character of the coast its direction also changes to the southward, and flats of 5 fathoms extend 5 miles off shore.

* See Admiralty chart.—Africa, West coast, Sheet XVII., Lekki to river Dodo, No. 1862; scale, $m = 0.25$ inch.

This termination of the sandy beach is a striking feature in the navigation of the bight of Benin. Thus far a vessel approaching from the westward may fearlessly run along the coast at the distance of a mile, except at the projecting bar of Lagos river, but, after passing Ajimo, muddy shallows of 3 or 4 fathoms in depth will be found within $2\frac{1}{2}$ miles of the shore.

The coast, for 6 miles south-east of the village with the two palm trees, is a mud-flat; no background trees give effect to those that are scattered along the margin of the sea, and the surf which breaks about 2 miles off shore is no longer heard; inside the rollers there is smooth water close to the shore. At the southern extreme of this mud-flat, two little openings, or vistas, into the lagoon may be observed; the shore then assumes a somewhat firmer character, and is interspersed with clumps of trees and scattered huts so far as the group of villages named Town; whence to Benin river the coast line is slightly concave, but its general trend is S.S.E. for a distance of 27 miles. At 12 miles north of the entrance to Benin river are two trees named the Sister trees, and some scattered groups of huts.

DELTA OF THE NIGER.—At Lagos the Delta of the Niger may be said to commence, for from Lagos, as well as from the mouths of the numerous rivers which debouch between Lagos and the Opobo, it is possible to ascend the Niger by utilising the many tortuous creeks which connect the rivers together, forming inland waterways which are navigable for boats throughout, and in most cases for light draught steamers.*

It is thus practicable to choose that river entrance where the bar offers the most favourable conditions for crossing, as, once inside, the deepest route by the creeks can be chosen for visiting the other parts of the Delta, and the dangerous shallow bars avoided; thus, it is now the practice to proceed to the Benin river from the Forcados, and not to cross the bar of the Benin, as at present the Forcados has the least dangerous bar and the greatest depth on it.

In making any of these Delta entrances it is generally by the soundings and discoloured appearance of the sea that the proximity to land is first ascertained, and the low coast line is first indicated by isolated trees, which appear as unconnected forest islets distorted by the mirage. On a nearer approach the fringe of coast forest becomes united in one line, broken only by the river entrance. Once over the bar and within the estuary, in smooth water, the river shores are fringed with mangroves,

See chart No. 1,862.

* *See Admiralty chart :—River Benin to river Cameroon, including the mouths of the river Kwara or Niger, No. 1,357; scale, $m = 0.12$ inch.*

behind which may be seen masses of inland forest, growing, where the land has acquired a sufficient firmness, above the limits of high water.

The weary monotony of the mangroves in the lower part of the Delta has a most depressing effect, but as the river is ascended the mangrove loses its exclusive possession of the shores, and is replaced first by forest trees, and higher up by park-like land. Notwithstanding the fact that the scenery up the river is more pleasing than near the coast, it is probable that the sea breeze experienced near the mouths of the rivers renders that part of the Delta the most healthy to Europeans, especially if they live in hulks, or in bung alows raised above the ground, where the miasma has less chance of affecting them at night.

The rivers which form the Delta of the Niger are as follows :—

Name of River.	Position of Mouth.		Depth on Bar at High Water Springs.	Used or not Used.
	Latitude.	Longitude.		
Benin - - -	5° 45' N.	5° 3' E.	15 feet	Used occasionally.
Escravos - - -	5 34 "	5 12 "	14 "	Not used.
Forcados - - -	5 23 "	5 19 "	22 "	Used regularly.
Ramos - - -	5 9 "	5 22 "	14 "	Not used.
Dodo - - -	4 51 "	5 28 "	8 "	"
Pennington - - -	4 43 "	5 33 "	10 "	"
Middleton - - -	4 31 "	5 40 "	19 "	Rarely used.
Sengana - - -	4 18 "	5 58 "	Breaks across	Not used.
Nun - - -	4 17 "	6 4 "	15 feet	Used regularly.
Brass - - -	4 17 "	6 13 "	18 "	"
St. Nicholas - - -	4 20 "	6 24 "	7 "	Not used.
St. Barbara - - -	4 22 "	6 34 "	Unknown	"
St. Bartholomew - - -	4 21 "	6 42 "	"	"
Sombrero - - -	4 23 "	6 54 "	15 feet	Not recommended.
New Calabar - - -	4 22 "	7 2 "	13 "	"
Bonny - - -	4 2 "	7 7 "	24 "	Used regularly.
Antonio - - -	4 25 "	7 21 "	Unknown	Not used.
Opobo - - -	4 28 "	7 35 "	15 feet	Used.

The best known of these are the Benin, the Forcados, the Nun, the Brass, the New Calabar, and the Bonny, and they all unite with the main stream of the Niger at, or below, Ndoni in latitude 5° 33' N., longitude 6° 33' E., and most of these various rivers will be described first, and then the main stream of the Niger above Ndoni. The Delta rivers, together with the Kwoibo and Old Calabar, are collectively termed the Palm Oil rivers.

See chart No. 1,357.

Principal entrance.—Up to a few years ago the Nun Entrance was considered to be the deepest and most accessible, but it is now superseded by the Forcados, which carries more water, and through which the greater part of the trade now passes. Steamers of 19 feet draught have passed over the Forcados bar.

Government.—The whole area of the Niger Delta is a British colony and possession, and is named Southern Nigeria—the part above Ida being named Northern Nigeria. The coast district extends from Benin to the Rio del Rey, the most important towns being Akassa on the river Nun; Assaba and Lukoja on the main stream of the Niger.

Natives.—The Natives inhabiting the Niger Delta are :—

1. The Jakri tribe, which may be considered as the ruling race between Lagos and Forcados river. They are principally canoe and fishermen, and appear to be in some respects superior in local civilisation to the other inhabitants of the Delta. They have a considerable show of wealth.

2. The Ijo tribe, which occupies the district between Middleton river and Antonio river, whilst between the Forcados and Middleton rivers the inhabitants are a mixture of Ijos and Jakrimen. The Ijos were not long since inveterate cannibals, and the custom is still continued though not so openly as formerly. The native priests, termed Ju Ju men, are bound to eat human flesh at certain times, and they do more to maintain this rite than any other natives. The Ijos are good labourers and are also useful in surf boats.

3. The Ibo tribe, which inhabits the district near the Opobo, and between that river and New Calabar, are an industrious race employed in agricultural pursuits and weaving grass cloth. They possess fine herds of cattle and flocks of sheep, goats, &c., but are unfortunately cannibals.

The whole of the inhabitants of the Delta, as far north as Lukoja, in the main stream of the Niger, are Pagans. Above Lukoja the Mohammedan religion prevails.

Crocodiles and Hippopotami are numerous throughout the whole delta of the Niger.

Barter Goods consist of salt, Manchester cotton goods, tin basins, cash bowls, and looking glasses.

See chart No. 1,357.

Trading Stations.—On the Niger Delta there are the following trading stations, where a certain amount of supplies may be obtained :—

	°	'	°	'	
New Benin, lat.	5	49	N., long.	5	7 E.
Gwato	,,	6	13	N., ,	5 19 E.
Sapele	,,	5	55	N., ,	5 45 E.
*Burutu	,,	5	21	N., ,	5 31 E.
*Ganagana	,,	5	24	N., ,	5 49 E.
*Asseh	,,	5	21	N., ,	6 18 E.
Wari	,,	5	32	N., ,	5 46 E. on the Wari river.
*Akassa	,,	4	19	N., ,	6 4 E.
*Akau	,,	4	41	N., ,	6 5 E.
Ekole	,,	4	58	N., ,	6 14 E.
*Sabogrega	,,	5	4	N., ,	6 16 E.
*Agheri	,,	5	18	N., ,	6 22 E.
*Abo	,,	5	32	N., ,	6 31 E.

BENIN RIVER, though joined to the delta of the Niger by the Nanna and Chanomi creeks, has an origin entirely distinct from that of the Niger. Its sources are at the head of the two small rivers, named Jamieson and Ethiope, which uniting at Sapele in latitude $5^{\circ} 55' N.$, longitude $5^{\circ} 45' E.$, flow westward to the sea under the name of Benin river. Both the Jamieson and Ethiope rivers are streams of beautifully clear water, and are said to rise from springs the exact situation of which has not yet (1898) been ascertained, but it is quite certain that the muddy waters of the Niger have nothing to do with their origin.†

On the right or north bank of the Benin river are several creeks or tributaries, viz., Davey or Ologi, Gwato, Addabrassa, and Lagos creeks, whilst on the left or south bank it is connected to the Escravos and Forcados rivers by the Alagico, Nanna, and Deli creeks.

Stations on the river.—The principal settlements, or stations on the Benin river, are New Benin, just inside the entrance; Youngtown, at the junction of the Nanna creek with the Benin river; and Sapele, at the junction of the Jamieson and Ethiope rivers, as previously mentioned. Higher up, on the Jamieson river, is Sapoba, and on the Ethiope river Eku and the treaty town of Obiaraku. The city of Benin is not on the river, but about 22 or 23 miles inland; it can be approached either from Gwato creek, or through the bush path leading nearly due north from Warrigi, a native village just below Sapele.

* At these stations wood for steaming purposes can be procured.

† See Admiralty Chart :—Lekki river to river Dodo, No. 1,862; scale, $m = 0.25$ inch.

Navigability.*—Although the Benin river is fronted by a bar over which the depths are only from 8 to 9 feet at low water, yet vessels of $16\frac{1}{2}$ feet, by entering the Forcados river and approaching the Benin through the Chanomi and Nanna creeks, can ascend to Sapele, 50 miles above its mouth. Above Sapele the Jamieson river is navigable, for vessels drawing 13 feet to Sapoba; and the Ethiope river by vessels drawing 15 feet for 25 miles, after which both rivers become so narrow and crooked that only steam launches can proceed further. These have explored the Ethiope for 50 miles above Sapele.*

Landmarks.—Three white houses on the southern shore outside the entrance to the Benin, one (the hospital) at a mile to the northward, and the other two at a quarter and half a mile, respectively, to the southward of Salt town, show conspicuously from seaward with the afternoon sun on them; also Harrison's house, easily recognised, as it is a conspicuous white house, the largest of four, inside the bar on the north bank.†

Salt town cannot be distinguished.

Communication.—The African Steamship Company's steamers call fortnightly, and those of the British and African Company monthly, at the Benin river proceeding up to Sapele; they generally go over Forcados bar and through Nanna and Chanomi creeks.

Steam-vessels run from Bonny (the *depôt*) weekly, calling at the intermediate rivers Brass, and Nun entrance of the Niger, on the way; they are due at Benin about a week after the arrival of the English mail steam-packets at Bonny.

Sailing vessels are usually towed over the bar by these local steam-vessels, the charge being about 40%, the steamers supplying their own hawsers.

Trade.—There is a large trade from this river in palm oil and ivory, as it forms the outlet of the wealthy Benin country. Five factories are situated on the north shore below Lagos creek, and two above the creek. There are branch houses in Deli creek.

See chart No. 1,862.

* H.M.S. *Phoebe* and *Philomel*, drawing $16\frac{1}{2}$ feet, ascended to Warri in 1897, and H.M.S. *Magpie*, drawing 13 feet, to Sapoba in the same year.

In February 1897, H.M.S. *Alecto* proceeded up the Jamieson river for a distance of 25 miles; the river, for the whole distance, being narrow and winding and the water very clear, deep, and perfectly fresh, but snags were plentiful. In some parts the river was so narrow that the paddles nearly touched the sides, and the ship was anchored in a depth of 5 fathoms, about 6 miles below Sapoba; it would have been possible to take the ship for a mile further up the river, but above that, although deep, it narrowed to 8 or 10 yards, with numerous snags, and was not navigable except for a steam launch.

† See plan of River Benin entrance, scale $m = 1\cdot0$ inch on Chart No. 1,862.

From Benin to Forcados the trade may be said to be in the hands of the Jakrimen, who are the middle-men and own many slaves. The busy season is from April to July.

Supplies.—Fresh beef and a few supplies can be obtained in Benin river, but with considerable difficulty.

Pilots.—The best pilots are the masters and mates of the local steam vessels. Native pilots for the Nanna and Chanomi creeks may be obtained at Gula at the entrance of Forcados river; they are said to be generally trustworthy.

Bar and Entrance.—The entrance to the Benin is difficult to distinguish from seaward; the northern entrance point forms a well-defined elbow, while on the southern side there is only a gentle curve difficult to recognise when bearing N.E. On the northern side breakers extend for $2\frac{1}{2}$ miles in a W. by S. direction, over which there are always heavy rollers. On the southern side is a spit extending 3 miles from the shore with two detached shoals of 6 feet still further off. Between these two shoals and the northern breakers is the bar, composed of hard sand, over which there are depths of from 8 to 9 feet at low water, and which, in the rainy season, frequently breaks heavily right across, but in the dry season is comparatively smooth.

Vessels drawing 11 to 12 feet cross this bar at spring tides during the last quarter flood, having regard to the state of the sea, which should be well considered, as it sometimes unexpectedly breaks with overwhelming force. There is, however, no advantage to be gained by vessels coming from the southward in entering the Benin river over its bar; it is far better to enter by the Forcados. Vessels from the northward, if of suitable draught and with the sea over the bar smooth, might do so and save time, but if the bar is unfavourable should proceed to Forcados.

Benin road.—This anchorage, 3 miles outside the bar, and $5\frac{1}{2}$ miles from the river's mouth, is the only one available for trading vessels which cannot cross the bar; and there the agents and natives will receive or deliver a cargo in local craft, aided if possible by a small steam-vessel. In this road much rolling and pitching must be expected, but it affords good holding ground; the most convenient position for anchoring will be found in $4\frac{1}{2}$ fathoms, black mud, with the North point bearing N.E. $\frac{3}{4}$ E., which is about the line of bearing for leading over the deepest part of the bar.

The lower reach of the river will appear open, but from the roadstead the houses are not distinguishable from the deck.

Buoy.—A buoy is generally moored in about 5 fathoms water, $6\frac{1}{2}$ miles, S.W. by W. from the entrance, but, being liable to be washed away, no dependence should be placed on it; see Caution; buoyage, page 33.

Dangers inside the bar.—Battery point is situated $3\frac{1}{2}$ miles, within the entrance, on the south bank; two islands lie off the point; Horsfall island, the northern, being about half a mile distant. These islands lie on a large sand-bank, which here fringes the southern bank of the river. At Battery point it is fully three-quarters of a mile broad and gradually narrows towards the southern entrance point from which its edge is distant about 3 cables. Booby town or Obobi is a village situated about $1\frac{1}{4}$ miles south-west of Battery point.

Tides.—It is high water, full and change, in the entrance of Benin river at 4 h. 30 m.; springs rise 7 feet, neaps $4\frac{1}{2}$ feet.

The tidal wave is stated to reach to Kanaka in the Ethiopie river, and to Gbiye on the Jamieson river.

Tidal stream.—The tidal stream in the river is said to sometimes run at a rate of 4 to 5 knots an hour.

On the bar, the ebb stream sets to the westward and the flood about E. by N., but a set, towards the northern breakers, has been experienced on the flood.

In December the flood stream runs only three hours, at the rate of 3 knots an hour, and the ebb as much as $9\frac{1}{2}$ hours at a rate of as much as 5 knots an hour. The discoloured water discharges itself over a range of 9 miles radius from the mouth of the river.

Current.—Off Benin river the general direction of the current is to the south-east, but after the harmattan has been blowing, it is often reversed and runs sometimes with considerable strength.

Directions.—Before attempting to cross the bar, the state of the sea and tide should be carefully considered, and no attempt should be made before the last quarter of the flood stream; nor even then if there is much sea, as it is better to go south to the Forcados than to take unnecessary risks.

The leading mark across the bar of Benin river is Harrison's house, already described, just open of the north entrance point, bearing N.E. $\frac{5}{8}$ E.; this will lead over in $8\frac{1}{2}$ feet at low water, spring tides.* When about one mile from North point, gradually haul to the eastward, rounding it at the distance of about half a mile, and when it bears N.W. steer along the western shore in from $2\frac{1}{2}$ to 5 fathoms water, keeping from 3 to 5 cables from the bank.

Anchorage.—Off Harrison house there is good holding ground in a depth of 7 fathoms, about 3 cables from the shore; there is also anchorage off Fort Douglas in $5\frac{1}{2}$ fathoms water, on the northern side of the river.

It is never advisable for strangers to spend a night within the bar if it can be avoided, as the exhalations from the river are notoriously

See chart No. 1862.

* *See view in chart No. 1,862.*

unhealthy, and the mosquitoes exceedingly troublesome; but should it be necessary to do so, a good berth is in 14 feet water, over mud, with North point bearing N.N.W., distant 9 cables.

Benin river above anchorage.—The Benin river, above the anchorage off New Benin or Harrison's house, is navigable without difficulty for any vessel, which can cross the bar, for 50 miles to Sapele at the junction of the Jamieson and Ethiope rivers. Ascending the river at 4 miles above Horsfall island, on the right bank, Lagos creek opens out; $3\frac{1}{2}$ miles further, on the same bank, is the entrance to Addabrassa creek; whilst about 4 miles further is the entrance to Gwato creek, which is one of the approaches to Benin city. Eight miles above Gwato creek's mouth is the entrance to Davey or Ologi creek.

On the left bank of the river, 3 miles above Horsfall island, is the entrance to Deli creek; 13 miles above Horsfall island is the entrance to Nanna creek, which is a deep-water channel to the Forcados river, and 20 miles further up is the entrance to Alagico creek.

Villages.—There are three villages on the north shore of Benin river, the western, $1\frac{1}{3}$ miles from the entrance, is known as Fish town. Brohemia, situated on a narrow creek, about midway between Lagos and Addabrassa creeks, was well built, but is now in ruins.

Lagos creek joins Addabrassa creek about 30 miles from its entrance; it appears to be only navigable for boats.

Addabrassa creek, which communicates with Lagos by a circuitous waterway, has a depth of 14 feet on a bar, where it joins the Benin river, but inside the bar the water deepens to 3, 7, and 12 fathoms for about 25 miles, where it joins Lagos creek. There are fishing stakes off the entrance to Addabrassa creek. H.M.S. *Alecto*, drawing $8\frac{1}{2}$ feet water, proceeded, in August 1894, a distance of 10 miles up Addabrassa creek.

Gwato creek* is navigable by vessels of 15 feet draught for a distance of about 15 miles, and by boats to Gwato, 9 miles further, from whence a road leads to Benin. Off the western entrance to Gwato creek, which is covered with high bush, is a shoal of 3 feet extending $1\frac{1}{2}$ cables in a south-east direction, whilst from the eastern entrance point a shoal, on which there are numerous snags, extends for a distance of 8 cables to the south-eastward.†

On the right bank of the creek, about 7 miles up, is a light-green triangular patch, $1\frac{1}{2}$ miles beyond which is the entrance to a creek, said

* H.M.S. *Barrosa*, drawing $15\frac{1}{2}$ feet, ascended this creek as far as Barrosa island in 1897.

† See Admiralty chart:—Wari and Benin rivers and creeks, No. 461; scale, $m = 1.0$ inch approximate.

to communicate with Addabrassa creek. Five miles further on is Barrosa island, which divides the creek into two channels. A shoal extends 2 cables from the south-west extreme of this island.

In the channel south of Barrosa island depths of 15 feet were obtained, but in the northern channel only 8 feet; beyond the junction of the two channels the depth diminishes to 6 feet to the creek leading to Gwato, beyond which the creek again deepens.

Gwato is situated on rising ground 25 feet above the river, about one third of a mile up a winding creek; the path to it is covered at high water. It is now only a small village with two factories, formerly it was of much more importance. Gilli-Gilli is a village, situated about half a mile west of Gwato, and Kaswar a fair-sized town 2 miles north of it, above this the Gwato creek bifurcates, the western branch leading to Egoru and the other to Egbin.

Directions for Gwato creek.—The outer part of the western entrance point should be passed at a distance of about 2 cables, gradually decreasing that distance to about one cable in entering the creek; thence a mid-channel course may be taken for 5 miles, when the eastern bank should be closed until opposite the commencement of reeds on the western bank.

Here the channel lies more towards the western bank, at about one-third of the breadth of the river from it, and it is necessary to sheer over into this channel, continuing in it until past the triangular green patch already mentioned; when, being nearly abreast the termination of the reeds, the eastern bank should again be closed.

The point, opposite the creek leading to Addabrassa, should be rounded close to the bushes to avoid a bank extending from the north point of that creek; after which a mid-channel course leads to half a mile south-west of Barrosa island.

Davey or Ologi creek, situated about 8 miles eastward of Gwato creek, extends 35 miles in an easterly direction, with several bends, to Ologbo; here the Benin expedition (1897) crossed the creek and found it to be about 50 yards in width, 14 feet in depth, and having a strong current. The pinnacle of H.M.S. *St. George* ascended this creek above 35 miles in 1897. It is very tortuous and narrow with a swift current and plenty of snags. The city of Benin is situated, approximately, N. by W., distant 21 miles from Ologbo by road, but scarcely 10 miles direct.

From Davey creek the distance is 26 miles to Warrigi; this was the starting point of the main body of the expedition to Benin city in 1897; the city being about 30 miles distant by road in a northerly direction.

Benin, situated about 25 miles from Gwato and 30 from Warrigi, can be approached by primitive paths through the bush from either place. It is an irregular straggling town formed by groups of houses separated by patches of bush, and is about $1\frac{1}{2}$ miles long east and west, and about a mile broad. It was formerly noted for the numerous human sacrifices which took place there, and was known as the "city of Blood."

Sapele, situated on the left bank of the river at the junction of the Ethiopie and Jamieson rivers with the Benin, and about 55 miles from its mouth, is the place where the British Vice-Consulate for the Niger Coast Protectorate has been established. Two factories have also been established here, and a hulk is moored in the river opposite the settlement. In 1897 H.M. Ships *Phæbe* and *Philomel*, drawing $16\frac{1}{2}$ feet, ascended the Benin to Sapele.

Anchorage.—The best anchorage is west of the Consulate.

Creeks on left bank of Benin river.—Deli creek, 3 miles eastward of Battery point, communicates with Nanna creek by Batari creek. It is reported to be deep, but so narrow that only small vessels or launches can use it. It is, however, little known.

Nanna creek, about 20 miles inside the entrance to Benin river, is more fully described below. Young town is situated on the east point of entrance.

COAST.—From the southern entrance point of Benin river the coast trends S.S.W. for 2 miles to Salt town, then south for 5 miles, and afterwards S.E. by S. for another 5 miles to the entrance of Escravos river; it is everywhere thickly wooded, but some remarkable clumps of fantastically shaped trees are conspicuous, some resembling the letter Y, while others have received the names of Ship-tree, Giraffe-tree, and Tower-tree. On the narrow sandy beach the swell breaks but slightly, after rolling in across the 5-fathoms flat, which extends 5 or 6 miles off shore.

ESCRAVOS RIVER.—The funnel-shaped opening of the river Escravos, which, unlike that of the Benin, has its southern entrance point the best defined, lies 13 miles south of Benin bar. Heavy breakers extend from this point for 3 miles to the north-west, and at first sight appear to join those from the northern entrance point, but there is occasionally a space at one-fourth of the distance across from the latter, where from 8 to 9 feet at low water may be found; this channel is, however, too precarious to be safely used.

Nanna and Chanomi creeks form a navigable waterway between Benin and Forcados rivers, a distance of 43 miles; these creeks

are named after the chiefs of the district through which they pass. There is a minimum depth of 15 feet in the two creeks which are commonly used by the African mail steamers; some of these vessels are 350 feet in length. The turns are sharp; and caution is necessary in entering or leaving Nanna creek at Young town as the tides set strongly across the entrance.

Buoys.—The channel of entrance to Nanna creek from Benin river, was, in 1894, marked by four small buoys, painted black. See also page 461.

Tides.—It is high water, full and change, in Escravos river at 4 h. 27 m.; springs rise 5 feet. The discoloured water is seen when 6 miles seaward of the entrance.

COAST.—From the south entrance point of Escravos river the coast, consisting of a narrow sandy beach, with mangroves, and backed by high trees, trends in a south-south-east direction for a distance of 7 miles to a point where there is a conspicuous clump of trees, and is fronted by heavy breakers, which extend 2 miles from the shore. From the conspicuous trees the coast turns S.E. by E. for 5 miles to the entrance of the Forcados river, and on this stretch the tops of the trees are from 100 to 150 feet above high water.

FORCADOS RIVER.—This river, the best and most accessible route to the Niger, and also to the Benin, has an entrance about 2 miles wide, which is sometimes mistaken for the entrance to Benin river, and in making the land, from the westward, it should be remembered that Forcados river entrance is fully open when bearing E. by S. $\frac{1}{2}$ S., whilst the Benin entrance opens out on a N.E. bearing.*

The shores of the lower course of the Forcados river are sandy and almost free from marsh and mangrove, and both banks are of moderate height, densely wooded, and bordered by a sandy beach. Ten miles within the entrance it bifurcates, the southern arm retaining the name of Forcados, whilst the northern arm is known as the Wari river.

The entrance is obstructed by a bar, but as the channel across carries from 17 to 18 feet at low water, and is of considerable width, Forcados river may be considered the most accessible estuary of any on this part of the coast, with smooth water 5 fathoms deep immediately within the bar. The distance from Goshawk point, Forcados river, to the Escravos by Chanomi creek is about 15 miles.

The branch of the Forcados river which enters the main river near Goshawk point joins the Odube creek at Bacaba, and thence takes an easterly direction and joins the main river of the Niger at Epedeh in

See charts Nos. 461, 1,862.

* See Admiralty chart :—Forcados river entrance, No. 3,115; scale, $m = 2\cdot0$ inches.

lat. $5^{\circ} 21'$ N. long. $6^{\circ} 21'$ E. The whole of this waterway, which is sometimes spoken of as the Forcados, had, during the month of December 1894, according to Commander Marx, of H.M.S. *Barrosa*, deep water, except some flats about 4 miles from Goshawk point, on which there was a depth of 10 feet at high water. The river is said to fall as much as 3 to 4 fathoms during the dry season, and the channels frequently change.

Ganagana, in lat. $5^{\circ} 24'$ N., long. $5^{\circ} 49'$ E., one of the principal stations of the Niger Company, is about 31 miles from Goshawk point by way of the Forcados river. For about 22 miles from the point the banks are covered with mangroves, thence the banks are cultivated and densely populated.

Communication.—The British and African Company's steamers call fortnightly, and those of the African Steamship Company three times a month. Cargo is transhipped to branch lines of steam vessels for Lagos, Benin, and Wari. There is a post office west of Moore point, and one on the east side of the entrance to Chanomi creek.

Moore and Goshawk points.—Moore point is a steep dark bluff, not easily recognised by a stranger, and situated on the north bank at about 5 miles within the entrance. Nearly three miles eastward of Moore point, and about 15 miles from the bar, is Goshawk point, which slopes gradually to the river, and forms the western entrance point to Chanomi creek.

South point.—The beacon that formerly stood on this point has disappeared. There is a conspicuous tree one mile inside the point, close to Gula village, and half a mile further to the eastward is a whitewashed house.

Forcados Bar.—The southern breakers extend about 6 miles N.W. by W. $\frac{1}{2}$ W. from South point. The northern breakers lie about 2 miles northward of the southern breakers, and from 3 to 4 miles off the northern bank of the river. There is no channel between them and that bank, except for boats and that only in smooth weather. The channel over the bar lies midway between, but nearly a mile outside, the breakers; it has a width of about half a mile. The breakers are usually plainly visible, but, in the harmattan season, this is frequently not so.

Least depth.—The depths on the bar are from 17 to 18 feet at low water; ships usually load to $19\frac{1}{2}$ feet, but never above 20 feet. During and after fresh westerly winds there is often a considerable scend on the bar, which must be allowed for.

Tides.—It is high water, full and change, in the entrance of Forcados river at 4 h. 22 m.; springs rise 5 feet. It is high water, full and change, at Burutu at 6 h. 0 m. (approximate); springs rise $4\frac{1}{4}$ feet; neaps rise $3\frac{1}{4}$ feet.

Tidal streams.—The flood stream runs 3 hours, at the rate of 2 knots an hour; the ebb 9 hours at 3 knots an hour, propelling the discoloured water 13 miles seaward.

In the creeks the flood stream runs $1\frac{1}{4}$ to 2 knots, and the ebb 2 to 3 knots an hour. At Burutu the ebb stream runs for about 7 hours, but at spring tides the flood does not make for more than 5 hours; at neaps for a much shorter period, and frequently there is no flood stream.* The effect of the tide is not felt beyond Baccaba when the river is high, but with a low river it reaches to Baragda.

Buoys.—The channel is marked by four buoys, which are supposed to be kept in position by the small steamers of the branch line.

In 1899 the buoys were as follows:—

A fairway buoy, conical, black.†

The bar buoy, conical, black, with *B.*, in white letters, marks the southern edge of the bar. Close to the eastward of it a cast of 15 feet was obtained, probably the position of a former buoy which is known to have sunk there and is doubtless causing a shoal to form.

Inner bar buoy, conical, black, with staff and cage moored in 28 feet water, about the centre of the channel and about three-quarters of a mile to the north-eastward of the end of the southern breakers. A mooring buoy, painted red, marking the northern side of the channel, distant from the inner bar buoy $2\frac{3}{4}$ miles, shows just to the right of Moore point after passing the inner bar buoy.

Pilots.—Vessels, proceeding above Goshawk point, usually stop at Gula village to pick up a pilot.

Directions for the Forcados bar.—Steamers, from the westward, generally endeavour to make the land to the northward and then, keeping in not less than 7 fathoms water, stand to the southward until the entrance to the river or the outer buoys can be distinguished. The first object seen, on the south side of the entrance, is the conspicuous tree on South point; it is the higher and right hand of two clumps just inside the point, but when first seen will show as a single tree.

About 6 miles to the northward of the river entrance is a fairly well defined point of high trees, a bearing of which, in conjunction with one of the conspicuous trees, will prove of great assistance in making the bar.

See chart No. 3,115.

* Chief Justice Moore.

† At the time of the survey (1899) this buoy had broken adrift and was not likely to be replaced for some months.

Goshawk and Moore points can seldom be distinguished one from the other as far out as the bar, even by a vessel leaving the river, and are quite useless as a mark for entering.

Pass from 1 to 2 cables on the north side of the bar buoy and steer E. $\frac{1}{4}$ N. to make the inner bar buoy, which should be passed close to, on either side of it. Then steer E. by S. $\frac{3}{4}$ S. to pass on the south side of the mooring buoy, which may be looked for just to the right of Moore point, and after passing the mooring buoy, steer as requisite up the river, keeping over towards South point.

Tidal stream.—On the bar, the flood tide sets across it to the northward, the ebb in the contrary direction, which must be allowed for.

Burutu, the principal trading settlement near the entrance of the Forcados, is situated just above the junction of the Forcados and the Wari rivers. The fairway to Burutu from Goshawk point is marked by stakes and is easy for vessels of 12 feet and under.

Communication.—At Burutu the mail steamers regularly call and tranship cargo, or proceed up the river. It is of equal importance with Akassa.

Hulks—The Niger Company have hulks stationed off Gula village, at the mouth of the river; at Burutu, Wari, Ganagana and at the junction of the Ramos river, and the junction of the Dodo river with Wari creek.

Chanomi creek, about 8 miles eastward of Forcados entrance on the north bank of that river forms with Nanna creek a navigable waterway between Forcados and Benin rivers, the distance being 43 miles and least depth obtained 15 feet. The southern entrance to this creek, between Goshawk and Wari points, is narrowed to about 3 cables by a shoal extending about 2 cables off Goshawk point, and by Madeira bank of a semicircular form, which, commencing at Wari point, extends for a distance of $1\frac{1}{2}$ miles in a westerly direction, and is there three-quarters of a mile off shore; it then closes to the east side of the creek in a northerly direction to a small bay where there is a post office.

Anchorage.—There is anchorage off Gula village abreast the conspicuous tree, in from 4 to 5 fathoms water; a white house is all that can be seen of the village from the river after the inner buoy is passed.

There is good anchorage, much frequented by merchant vessels, about three-quarters of a mile south of Goshawk point; during the rainy season, when the swell extends in so far as Goshawk point, vessels generally anchor closer in at the entrance of Chanomi creek.

Directions from Forcados river through Chanomi and Nanna creeks to Benin river and thence to Sapele.—Round Goshawk point at a distance of 3 cables, and haul

into Chanomi creek. At $2\frac{1}{2}$ miles above Dempster creek (2 miles within the entrance and on the left or east bank) the Chanomi creek branches in three directions; Rawson creek, on the left, appears as a continuation of the main creek and is liable to deceive strangers; Craig creek is on the right. *See* Caution; pilotage, page 33.

The centre of the three branches should be taken: it has a very narrow entrance and does not open out until the vessel is close to it, when it will be seen to trend to the north-eastward and then turn sharply north-westward, gradually widening from a breadth of 60 yards to 250 yards. Keep in the centre of the creek,* giving all points a wide berth as the deep water will be found in the bends.

There is a very sharp turn at the south extreme of the island which fronts Elder creek, and when past this steer for the centre of Harvey creek, keeping in mid-channel when rounding Bedford point, to avoid a shoal extending off it, also taking care to guard against the tidal streams which appear to meet hereabouts; when Chanomi creek opens out again, follow the bends as before.

After rounding Powell point the Escravos river will open out, and Rugged point must be rounded at a distance of a cable, guarding against eddies; then keep from $1\frac{1}{2}$ to 2 cables off the southern bank of the Escravos river, until abreast Campbell point.

From Campbell point steer about N.E. $\frac{1}{2}$ N. across the Escravos river and up Nanna creek, keeping the point astern so as to pass about 2 cables off Escardos point; and steer for Widgeon point, keeping three conspicuous trees, on the north bank of Jones creek, a little open of the point, bearing about N.E. by N.; when about half a mile past Joe town the shoalest water will probably be found, then steer across for Harrison point,† which can be passed within a cable. Having passed Deli creek, keep in mid-channel, but well in the bends when passing the points.

At $2\frac{1}{2}$ miles after passing Magrath creek, Nanna creek splits into two, the wider of the two turns south-eastward and is named Alagico creek;‡ the other, the Nanna, turns sharply round to N. by E. and thence W.N.W., and is about 100 yards wide, and very winding for the remainder of its course. Keep in the centre, the width being from 60 to 100 yards with high mangroves on both banks, for $3\frac{1}{2}$ miles, when the creek again divides into two branches; that to the south-eastward, named Hely creek, is 150 yards wide, the other turns sharply round to south-west and thence north-west, and is only 60 yards wide; this place, known as the Fork,

See chart No. 461.

* Said to be deeper water on port hand, proceeding north. Remark book, Navigating Officer, H.M.S. *Maggie*, 1897.

† H.M.S. *Phæbe*, 1897, found only from 3 to 4 fathoms water off Harrison point. Remark Book, Navigating Officer, H.M.S. *Phæbe*, 1897.

‡ It is stated that there is a deep water channel through this creek.

is where the tides meet. Steamers often have to anchor to enable them to turn, it is therefore advisable to have a stern anchor ready to let go.

The banks at the "Fork" have low mangroves on the western point round which it is necessary to turn, and high on the eastern and northern bank; this will be a good guide when approaching the Fork. Proceed in mid-channel up the western branch of the creek, for a little more than 5 miles, until the village of Young town on the Benin river, is sighted. A little below the village there is a conspicuous white tree* (the highest about there); when abreast of it, gradually alter course for Palmas point, bringing the tree astern; this kept a little open of the point will lead close to the banks off the entrance, and into Benin river.

Buoys.—There are four cask buoys marking the channel; they are small, painted red on the east side and black on the west, and not to be depended upon; the tidal streams here set strongly on either bank, and great care is necessary. There are fishing stakes and boxes off Palmas point; it is possible to mistake the latter for the buoys.

Young town to Sapele Consulate.—The distance is about 35 miles and the least depth obtained 15 feet; the banks in the creek are of soft mud and said to shift. *See* Caution; pilotage, page 33.

If proceeding up to Sapele from abreast Young town, steer across for the north bank, keeping about one cable off it until past Davey creek; thence in mid river. A shoal extends from the north bank towards the Lecky islets; it is advisable to keep over towards them in passing to avoid it, gradually altering course as necessary, when passing the islets, for Capps town; when the river opens out again, alter course to south-east, keeping well over to the eastern bank until past Lalor point, then alter course to the south-south-eastward, keeping more over to the eastern bank.

When the south point of Fagan island is abeam, gradually alter course to S.E. for the south bank, keeping close along it until the river is seen to branch into two creeks on either side of Yoruba island (low and marshy). Steer up the centre of the creek running to the northward of the island, passing close to the village of Ogu, then keep in mid-channel until off Wright creek, when three islets will be seen ahead covered with reeds, two on the west and one on the east side of the river; steer to pass between these islets, keeping a little closer to the two on the west side.

When past the islets keep on the northern side of the river, to avoid a shoal, with 9 feet water over it, which lies in mid-channel about half way between the three islets and Warrigi and when nearly abreast of Aruka village, gradually alter course to south-south-westward, passing between the west bank of the river and Munro island.†

See chart No. 461.

* "Could not be seen." Remark Book, Navigating Officer, H.M.S. *Phæbe*, 1897."

† The channel north-east of Munro island is also navigable and said to be preferable. Remark book, Navigating Officer, H.M.S. *Maggie*, 1897.

Off the south point of this island there is a small, low, and marshy islet; pass between it and Munro island, when the consular buildings and the hulk *Hindustan* will be seen ahead; off the hulk there is a low, marshy islet; pass between it and the north bank and anchor where convenient when above it, or a berth may be found westward of the islet.

Wari river, which joins the Forcados a little above the entrance to Chanomi creek, is navigable by vessels of about 13 feet draught to Wari.

Wari Consulate and factories are situated about 30 miles from Goshawk point; the Royal Niger Company have a station here, and other stations up the Wari branch.

Here the river is about 400 feet wide, but there are 3 fathoms at low water close to both banks and if swung to the ebb, a hawser to a tree would easily slew the vessel for returning. The factories are built in clearings amongst the mangrove swamps, the upper factories and consulate being on the north bank. The town of Wari, situated on the south bank, close to the lower factories, is a swampy-looking place of some size and peopled by Zekris who consider it a sacred spot; there are also numerous villages in the swamps surrounding the factories, most of them concealed from view. The chief trade is in palm oil obtained from the Sobo country.

Communication.—The African Steamship Company's steamers call fortnightly, and those of the British and African Company monthly, at Wari.

Directions from Goshawk point to Wari.—From the anchorage off Goshawk point steer to pass about 2 cables off Wari point ($2\frac{1}{2}$ miles), taking care not to shut in the points at the entrance of the Forcados river. Having passed Wari point, keep about one cable off the west bank of the river, and gradually edge across for Marescaux point (7 miles from Wari point), which can be rounded at distances of from $2\frac{1}{2}$ to 3 cables; having rounded this point, keep close along the mangroves on the southern shore for about 6 miles or until nearly abreast Porter creek, where there is a hollow in the bank, when the course should be altered to the north-north-eastward for $1\frac{1}{2}$ miles towards a small conical buoy off the Ivy bank, which should be passed at a distance of about a quarter of a cable on the starboard hand. See Caution; pilotage, page 33.

When abreast of the buoy, alter course for the northern green patch of three that will be seen in the mangroves on the western bank; and keep along this bank at the distance of about half a cable for about 2 miles until past some high land and trees, when Gallwey creek should be opening. Care is necessary in rounding MacDonald point, as here less water than charted is reported.

From Gallwey creek steer a southerly course for $1\frac{1}{2}$ miles across the river for the point south of MacDonald point, keeping it a little on

the starboard bow, and passing close to it. From this keep close along the mangroves until nearly abreast Hampson creek, which is very small, and situated at the west extreme of some high trees; then close the mangroves on the north bank until abreast some trees with white stumps, south of Benin creek, observing that the Dodo bank probably extends further than charted.

From these trees the river is crossed in a southerly direction, and the next point to the east should be kept well open of the high round clump, close to the mangroves on the south bank, keeping close along the mangroves until nearly abreast of the second of two green patches of trees, when the river should be again crossed to the north bank, keeping close to the mangroves till nearly abreast Roth creek.

When off Roth creek ($2\frac{1}{2}$ miles above Hampson creek) steer across for the southern bank, about a mile, to where some reddish cliffs will be seen ahead, keeping the mangroves on the west bank close to until nearly abreast the eastern red cliff, when gradually alter course into mid-channel, passing about half a cable off a buoy, on the edge of Daisy bank.

Having passed Crawford and Dundas creeks ($1\frac{1}{2}$ miles above Daisy bank buoy) Pinnock's factory on the southern bank will suddenly appear round the bend; steer as close as possible to the factory, and after passing it gradually alter course for the north bank of the river to avoid a bank off the west point of the Odube creek; when above the creek, anchor either a little below Miller Brothers' factory, or abreast of the creek leading to Wari town.

The least depth obtained by H.M.S. *Alecto* between Goshawk point and Wari was 15 feet.

Vessels can secure alongside the bank opposite Miller Brothers' factory. The British Consulate (Wari) is just above the factory.

Odube creek, joining the upper part of the Wari river to the Forcados at Bacaba, is entered on the south bank of the Wari, between the upper and lower factories, and has a south-westerly direction for nearly 9 miles to the Forcados flats, a large creek communicating with the Forcados river; the Odube creek then turns to the south-east for 6 miles and joins the Forcados river.

Directions from Wari to Ganagana through the Odube creek.—From abreast the Consulate proceed up the Odube creek, keeping in mid-channel all the way; 8 miles above its entrance the Forcados flats will be seen ahead; give the point abreast of the flats a wide berth, as there is an extensive bank off it. The low grass of the point is covered in the rainy season. Six miles farther the Odube creek joins the Forcados river at the village of Bacaba. For route beyond *see* page 464. The least depth obtained at low water was 11 feet.

See chart, No. 461.

Directions from Goshawk point to Ganagana by the Forcados river.—The distance is 31 miles, and the least water obtained 9 feet.

From the anchorage at Goshawk point, steer towards Kwarra point, one mile from the anchorage, but as there is an extensive flat and some detached banks off that point, great caution is required when approaching it. The fairway from the anchorage to Burutu point is now (1898) marked by stakes, which greatly assist the navigation.

When the factory at Burutu, 4 miles above Kwarra, comes on with Boma point, on which there are some trees, bearing about E. by S. $\frac{1}{4}$ S., and the conspicuous white trees south of Kwarra point are open, steer about E. by S. for Boma point, and when nearing the trees on it keep as close to the bush as possible as far as Burutu factory; observing that from Kwarra point the factory should be shut in by Boma point, bearing about E. by S., until off that point; a bank off Muri creek, one mile above Kwarra point, is marked by two small buoys.

Above Burutu factory, keep a little more than a cable off the south bank of the river until past Britten island, then gradually haul to the northward until past Goldie creek, on the north bank, 3 miles above the factory, when steer to pass a cable off Penfold island; rounding its north point and keeping this distance off it until abreast of the south point of the island, then keep again in mid-channel. A little more than a mile above Croft creek keep over to the south bank of the river to avoid a small shoal, and about 2 miles further on the village of Bacaba (Beacabo) will appear, which can be passed close to; and when Odube creek opens well out, alter course to keep well in the middle of the creek.

There is a bank off the point opposite Bacaba which should be given a wide berth. Keep close to the south side of the creek when approaching the village of Ayakromo, to avoid a bank off the point opposite the village, and after having passed Ayakromo keep in mid-channel until approaching the next point, when keep well into the bend, and having rounded it and the next point, the Niger Company's hulk, moored off a low grassy islet at Ganagana, will be seen; keep across to the north bank when approaching the hulk, and, when abreast, cross over.

Route to the Niger.—Vessels wishing to proceed above Ganagana into the Niger can do so only at certain months, namely, from July to November, when the river is high; then their draught should not be more than 10 feet. In December 1894 Commander Marx, of H.M.S. *Barrosa*, proceeded up the Forcados to Ganagana.

COAST.—The coast southward of Forcados river has the same monotonous features as that to the northward; a dense forest and thick jungle rises from a narrow sandy beach, on which the surf but feebly breaks. In the whole space between Forcados and Dodo rivers there is no

sign of habitation, and no apparent background, until on opening the river Ramos, the receding plain and its thick forests are perceptible.*

No columns of smoke are to be seen by day, nor fires by night, to give animation to its gloomy and forbidding aspect; an aspect, however, which is quite in keeping with the character of its treacherous and murderous inhabitants.† From the south entrance point of Forcados river the coast trends S. $\frac{1}{4}$ W. for a distance of 13 miles to the entrance of Ramos river.

Currents.—Off the Forcados river, during the tornado season, and especially after a tornado, a westerly current of from a half to one knot an hour sets along the coast.

Depths off shore.—The bank of soundings to the 100-fathoms line extends 30 miles west from the mouth of Forcados river, deepening suddenly from 90 fathoms, over black mud, to 180 fathoms, over sand. The 5-fathoms line, which lies 5 miles west of Forcados river, approaches the shore a little to the southward of it to within 3 miles.

RAMOS RIVER.—The outlet of this river is half a mile wide between its entrance points, which are well defined; a dome-shaped tree appears in the background between them, when bearing E. by S. $\frac{1}{2}$ S., which mark leads into the very limited channel over the bar. From the northern entrance point a sward and sandy spit, named Murder spit, extends a mile seaward, and a village stands near the high-water mark at three-quarters of a mile within the south entrance point. Should it be necessary to enter this river from the sea, the bar will be found most tranquil in the dry season; but as it is connected by creeks with the Forcados river it is probable that it may be more accessible through them. The creeks have not, however, been yet explored.

Bar.—A belt of heavy breakers extends $2\frac{1}{2}$ miles from the shore in front of Ramos river, leaving occasionally in the middle a smooth space of a third of a mile in width. This part of the bar is a mile across, with 9 feet on it at low water, and therefore subject to a dangerous scend of the swell. Inside the entrance points the estuary has straight sides which are “steep-to” for 2 miles, with depths of 3, 5, and 7 fathoms, and smooth water. The bar may be crossed in the best water, and the first reach passed through, by bringing the dome tree to appear in the centre of the

* See Admiralty chart:—Africa, West coast, Sheet XVIII., River Dodo to Bonny river, No. 1,863. Scale, $m=0.25$ inch.

† In Ramos river, in April 1846, H.M.S. *Acorn* lost two most zealous and promising young officers, Henry Pennington and OZIAH A. WINSTANLEY, who were there surprised and barbarously murdered.

opening, and steering for it on the bearing of E. by S. $\frac{1}{2}$ S., but before attempting to cross it should be examined.

Anchorage.—The best anchorage, outside the bar, will be found with the entrance bearing about E. by S. in 5 fathoms water, over black mud, at 3 miles off the bar and 5 miles from the river's mouth.

Depths off shore.—The 100-fathoms edge of the bank is 29 miles off shore, in a westerly direction from the entrance to Ramos river.

Tides.—It is high water, full and change, in Ramos river at 4 h. 20 m. ; springs rise 5 feet. The ebb runs for 9 hours.

DODO RIVER.—From Ramos river the coast maintains the same appearance, and the same general southerly trend for a distance of 18 miles, where another river issues through an oblique opening with an island in its mouth. This river, known as the Dodo, is only three-quarters of a mile wide in its lower reach, though the opening in the shore at its mouth appears to be nearly 3 miles broad.

Walker island, which occupies the southern portion of the river mouth, is thickly wooded at its eastern angle. All access for vessels to Dodo river, direct from the sea, is apparently prevented by the shoals which extend 3 miles north and south of this island, and $1\frac{1}{2}$ miles to seaward.

Boat entrance.—Should, however, any object necessitate a boat expedition into this uninviting place, an opening in the breakers may be sought in the dry season close over on the northern side, where there is a channel one-third of a mile wide and 8 feet deep, found by bringing the lower reach of the river open to the northward of Walker island, on the bearing of S.S.E. $\frac{1}{4}$ E.; the last hour of the flood at spring tides is the best time for entering and a good look-out must be kept for the bar rollers, when approaching a low point which projects half a mile in a westerly direction from the northern elbow of the entrance.

CAUTION.—The natives in this locality are troublesome and dangerous, and, like those in Ramos river, launch out from the creeks in large numbers, armed with rifles, cane-knives, and hatchets; their pretence for coming being at first to offer dried fish for sale.

Anchorage.—Anchorage may be obtained in 4 fathoms water, over black mud, with a distant arched tree in line with the northern extremity of the trees on Walker island, bearing E.S.E.

The 5-fathoms flat extends $2\frac{1}{4}$ miles west of Walker island, and $1\frac{1}{2}$ miles outside the bar breakers. The discoloured waters of this river, like those of the Ramos, are seen when 7 miles in the offing.

Tides.—It is high water, full and change, in Dodo river at 4 h. 17 m. ; springs rise 5 feet.

Tidal stream.—Off the entrance to Dodo river the ebb stream, which runs for 9 hours, sets north from the bar and the flood south ; the outside current generally sets south about a knot an hour.

PENNINGTON RIVER.—From Dodo river southward, the coast is of the same featureless character, but bends nearly two points more to the eastward.

The depth of 5 fathoms is found at a distance of $3\frac{1}{4}$ miles off shore, so far as Pennington river, a small opening, seen on a S.E. by E. bearing. The entrance, a third of a mile wide, within the entrance points, has only 6 feet upon the bar, which extends over an area of $1\frac{1}{2}$ miles. A narrow passage, between heavy and dangerous breakers, will be found by keeping the entrance upon the above bearing.

MIDDLETON RIVER.—From Pennington river the coast trends S. by E. $\frac{1}{2}$ E. for a distance of 14 miles to the river Middleton, which from the offing has the appearance of a wide-mouthed estuary, with an island at its entrance (Miller island), leaving channels of equal breadth on either side. The southern channel is not navigable and is named False entrance.*

The main entrance in 1873, between George island and Miller island, was nearly a mile wide, though the navigable part of the channel was narrowed by a spit extending half a mile from the north extreme of Miller island.

Bar.—From George island a narrow curved spit extended $2\frac{1}{2}$ miles to the southward, between which and the bank extending from the south side of Miller island there was a channel, about a third of a mile wide, in which the least depth was $2\frac{1}{2}$ fathoms.

On the north shore inside of the entrance, at about $1\frac{1}{4}$ miles east of George island, is situated an English factory.

Miller island is separated from the mainland by a narrow 3-fathoms channel, which connects the main and false entrances to Middleton river ; a shoal spit connects the south extreme of Miller island with South point on the south side of False entrance.

Directions.—Before entering this river it would be advisable to examine the bar, the stability of which is very uncertain. In 1873 a vessel approaching from the westward was recommended to keep in not less than 5 fathoms water, until South point bore E. $\frac{1}{4}$ N., when it might be steered for on that bearing ; and on the depth being reduced to

See chart No. 1,863.

* *See plan of Middleton river ; scale, m=1.0 inch, on Admiralty chart, No. 1,863.*

3 fathoms, to alter course to N. $\frac{1}{2}$ W. for $1\frac{1}{2}$ miles, steering for North point. This would then lead between the western banks and lee breakers, which latter extended a mile south-west of Miller island.

With Miller island south extreme bearing E. by S. $\frac{1}{2}$ S., the course was then for the centre of George island, until Lobia point (the next east of the factory), came in line with Factory point, about E. by N., which latter mark led to the anchorage.

The western edge of the bank, south of Miller island, does not always break.

Depths off shore.—A flat, with muddy bottom, extends 3 miles off the mainland, and the depth of 5 fathoms is found at $1\frac{1}{2}$ miles outside the bar; the 100-fathoms edge of the bank of soundings is 30 miles off shore, and the discoloured water from the river is met when about 4 miles to seaward.

Tides.—It is high water, full and change, in Pennington and Middleton rivers at 4 h. 15 m.; springs rise 5 feet. The ebb stream runs for 9 hours.

BLIND CREEK, 3 miles south-east of False entrance, is an inaccessible opening, about a quarter of a mile in width, from which breakers extend nearly a mile seaward.

Winstanley outfalls.—From Blind creek the coast line trends a little more easterly, with a mangrove-covered shore, and similar quality of soundings, until, at 7 miles distant, two apparently river entrances, known as the Winstanley outfalls, are seen from the north-west. They are a mile apart, and both barred by heavy breakers; discoloured water extends over a range of 4 miles seaward of the entrance to Winstanley outfalls.

Sengana branch.—A similar mangrove covered shore extends S.E. $\frac{1}{4}$ S., for a distance of 13 miles from Winstanley eastern outfall to the Sengana branch of the Niger, the entrance to which is so obstructed by a sand-bank in the centre, and by the turbulent breakers which extend a mile seaward, that although presenting a rather inviting appearance at first sight, it is not accessible.

By patiently watching for a favourable opportunity, landing may be effected on the outer beach, just to the northward of the northern entrance point, within which there is a sheet of smooth water; but at the time of the Admiralty survey, the apparent disposition of the natives rendered any further examination of the place imprudent.

Depths off shore.—The depth of 5 fathoms is found at a distance of 4 miles seaward from the entrance to Sengana branch, the discoloured water from which extends about that distance from the shore.

NUN RIVER.—At 6 miles S.E. $\frac{3}{4}$ E. from Sengana branch, 110 miles from the entrance of Benin river, and 319 miles on the bearing of S.E. by E. from cape St. Paul, is situated the Nun entrance to the Niger river, which was formerly considered the principal entrance, though it is not so now.

The Nun mouth of the Niger is imposing when first entered from the sea, but after passing the broad creeks which lead towards Brass river, the actual navigable passage narrows down into an insignificant channel, and it is not until the numerous off-shoots on both sides are passed that the main stream regains the breadth commensurate with its importance. In many portions, below its bifurcation with the Forcados, the Nun river is very shallow, and it is here, in the dry season, some of the chief difficulties of the navigation of this branch of the Niger are met with.

Nun entrance lies between cape Nun and Palm point, the former bearing from the latter N.W. by N. distant $1\frac{1}{3}$ miles. The shores on both sides are thickly wooded, and are so nearly upon the level of the river as to form a vast pestilential swamp.*

This entrance somewhat resembles that of the Sengana branch, the latter being not unfrequently mistaken for it. The point of difference between them is that when the rivers are seen from abeam the Sengana entrance points are both bluff, while in the Nun entrance the eastern point is bluff and the western point a much more gradual slope. In clear weather the factory at Barracoön point would be seen when the lower reach of the river fairly opens out.

A narrow island, nearly half a mile long north and south, has formed off cape Nun; it is covered with grass and shows about 6 feet above high water springs.

Cape Nun, the western entrance point, is low and wooded, but the bush near the point is lower and slopes more gradually than at Palm point.

Palm point, the eastern entrance point, in latitude $4^{\circ} 16' 10''$ N., longitude $6^{\circ} 4' 50''$ E., is also low and densely wooded. A native village and mission house stand on the margin of the eastern shore, $1\frac{1}{3}$ miles north of Palm point, and Akassa, the chief's village, is situated half a mile inland of that village.

Trotter point, lying on the eastern side of the channel, N. by E. $\frac{1}{4}$ E. distant 3 miles from Palm point, is low with a remarkable clump of high trees not far from its extremity.

Akassa.—Barracoön point, lying 2 miles north-north-east from cape Nun, has on its northern side the Royal Niger Company's establishment,

See chart No. 1,863.

* See Admiralty chart :—Niger river (Nun entrance), No. 146; scale, $m = 2.0$ inches.

named Akassa, which is the depôt station for the whole of the Niger territories; the place presents a busy appearance, ocean and river steamers coming and going daily. Several acres of ground are covered with dwelling-houses, offices, factories, and store houses, and viewed from the river there is something picturesque about the station, with its bright green surroundings, and background of sombre, impenetrable forest. The Company possess more than 20 steam-vessels and steam launches for trade on the Niger and its branches. A great part of the transshipment between river and ocean steam-vessels is transacted here.

The native village of Akassa, on the opposite side of the river and nearer the sea, consists of small quadrangular shaped huts, constructed of palm fronds and thatched with palm leaves, crowded together in small clearings among the mangroves. The inhabitants, a slight-built and active people, employ themselves in fishing and agriculture, speak the Brass language, and have little intercourse with the English settlement.*

Communication.—The African S.S. Company's steamers call here fortnightly, but they are not to be depended upon, as some of the vessels cannot cross the bar.

Coal.—A considerable quantity of coal, about 1,000 tons (mostly Welsh), is always in store. There are two wharves for coaling, or loading and unloading at; the upper wharf, a solid structure, has 10 feet at low water alongside, but it is only about 30 feet wide at the head; the other wharf has a depth of 13 feet alongside, and is always used by the vessels of the African and the British and African steam companies. It is necessary to have anchors down as off fasts, both on the bow and quarter, to hold the vessel against the tide, which, on the ebb, runs strongly. It is also advisable to go alongside at slack water, and to secure with the vessel's head up stream. Vessels can also coal alongside any vessel which might happen to be in port waiting to discharge.

Supplies.—The Royal Niger Company's officers are most obliging in providing live stock, fruit, and vegetables, and will also make arrangements for supplying the same at their different factories up the river, in case they should be required. They have, in addition, wooding stations at several points on the river, *see* pages 149, 174, 175.

Patent slip.—There is a patent slip belonging to the Royal Niger Company, which will take a vessel of 200 tons displacement; the cradle is 28 feet in breadth, and the depth aft is 12 feet.

Repairs.—Small repairs to machinery can be made good at a small engine factory with a smithery attached.

See chart No. 146.

* "Up the Niger," Captain A. F. Mockler-Ferryman, F.R.G.S.

Channel.—At Barracoön point the channel is three-quarters of a mile wide, and above that point it expands considerably in width for a distance of 3 miles, when it again becomes contracted.

Western spit extends from cape Nun in a southerly direction for $1\frac{1}{2}$ miles, and almost always breaks heavily. The eastern edge is nearly straight and fairly “steep-to,” the 3-fathoms line being about $1\frac{1}{2}$ cables from the line of breakers, and running parallel to them.

Eastern spit.—The breakers in fine weather and at low water extend for over half a mile to the southward of Palm point, but the shallow water stretches three-quarters of a mile further to the southward, forming the Eastern spit, where there are always heavy rollers, within the influence of which it is dangerous for a vessel to get. The south-western extremity of Eastern spit is situated $1\frac{1}{4}$ miles south of Palm point, from thence it turns sharply to the eastward, following the line of the coast. The western edge is fairly straight, and deepens gradually into the bed of the river.

Bar.—Depth.—The bar consists of a semi-circular belt of sands with breakers, half a mile in width, connecting the Eastern and Western spits, over which the general depths are from 7 to 9 feet on the western side, and from 10 to 12 feet at low water on the eastern side, the outermost part of the bar being upwards of 3 miles S. by W. $\frac{1}{2}$ W. from Palm point.

In the rainy season the bar frequently breaks all over, but in the dry season, when it is smooth, it only breaks on the spits and on the shoaler parts of the bar.

The bottom is of hard sand everywhere on the bar, and changes to mud immediately when off it.

There are two channels across the bar, the Western, named the Weather channel, and the Eastern the Lee channel.

Ships crossing usually load to $14\frac{1}{2}$ feet draught, but never above 15 feet. In 1896 H.M.S. *Magpie* crossing the bar had only one cast of 15 feet; it is considered that 15 feet is the greatest depth that could be depended on at high water, spring tides.

When the leading marks are not visible the lee breakers afford a sufficient guide for crossing, unless the sea be very smooth, when boats should be moored to show the edges of the banks.

Tides.—It is high water full and change in the Nun entrance at 4h. 15m. Springs rise 5 feet: neaps $3\frac{1}{2}$ feet.

Tidal stream.—In December the ebb stream runs for 8 hours at a rate of 4 to 5 knots at springs and the flood for 4 hours at 3 to 4 knots.

With a high river the effect of the tide is not felt beyond Sunday island, with a low river it is appreciable as far as Agberi.

Buoys.—The entrance is generally marked by a fairway buoy off the bar, and a buoy half a mile south-west of the Eastern spit, but their positions can only be given approximately; also they are liable to break adrift, and should not be depended on. In 1899 the fairway buoy, conical and painted red, was moored with Palm point bearing N. by W. $\frac{5}{8}$ W., distant $3\frac{6}{10}$ miles, and the inner buoy, conical, painted black, and surmounted by a staff and globe, on the leading line of the Weather channel, with Palm point bearing N. by E. $\frac{1}{2}$ E., distant $1\frac{1}{2}$ miles. *See Caution; buoyage, page 33.*

Pilots.—No native pilots are to be obtained. The masters of the trading vessels which may be in the river occasionally act as such, but the most trustworthy pilots are the masters and mates of the branch steam-vessels which run weekly from Bonny, and are due from four to five days after the arrival of the outward-bound mail steamer at that place.

Outer anchorage.—A prudent distance to anchor outside the Nun entrance is 3 miles from the bar in 7 fathoms water, on the leading mark for the Weather channel. This anchorage is very disagreeable, owing to the heavy swell, to which vessels generally lie broadside on in consequence of the easterly current. In 1883 the ships forming the Niger Expedition anchored in $8\frac{1}{2}$ fathoms water, off the river's mouth, with the same view of the river's mouth as given on chart No. 146 of the Niger; here it was found that the vessels lay quietly, the wash from the river keeping their heads towards it, thus preventing their swinging broadside on to the swell and rolling, as is generally the case.

Inner anchorage.—The best berth inside is off Barracoon point in $8\frac{1}{2}$ fathoms water, over mud, with the centre of the factories bearing West, distant a quarter of a mile, the river entrance being kept well open to get the sea breeze.

Directions.—Weather channel.—To enter by this channel, bring Trotter Tree* just inside of Palm point bearing N. by E. $\frac{3}{8}$ E. (the buoy being in line with Trotter point); this mark leads over the bar in 9 feet at low water, spring tides. The channel is narrow, having depths of 7 feet at 160 yards on either side of the centre, but it has the advantage of the sea being end-on to the vessel while crossing the bar, which is here half a mile broad.

On deepening the water, borrow to the westward slightly, and steer up in mid-channel for the factories.

Lee channel.—This is the best and deepest channel into the Nun river. When approaching from the eastward, after passing Brass river, haul gradually into a depth of 4 fathoms (at low water), keeping along the

See chart No. 146.

* Could not be distinguished, 1893.

shore in that depth and steering about W. by N. $\frac{1}{2}$ N., until Sengana point, which makes as a low bluff (the west point of Sengana river being shut in), is sighted on the starboard bow, bearing about N.W. $\frac{1}{2}$ W.*

To enter.—Bring Sengana point to bear N.W. $\frac{1}{3}$ N., or just open northward of the buoy off the Eastern spit (if in position). This bearing will lead over the bar, which is here three-quarters of a mile wide.

The narrow and shoal part of the channel is passed when the factories open of Palm point, bearing about N. $\frac{1}{4}$ E.

Pass the buoy off Eastern spit close-to on either hand, and steer up in mid-channel for the factories.

After passing Palm point, a smooth reach of one mile wide, with depths of 5, 6, and 7 fathoms in it, extends for 3 miles to Trotter point, with 4 fathoms within 2 cables of its eastern shore.

The effect of the ebb tide will not be much felt till the river begins to open, when it immediately sets the vessel to the southward very strongly.

Akassa creek, affording communication with Brass river, and available for vessels drawing 4 feet water, is entered on the eastern side of the channel, 3 miles above Barracoon point.

CAUTION.—In using both the Weather and Lee channels, the tides should be carefully studied, the best time for entering being during the last quarter of the flood. It should be borne in mind that in bad weather there is a heavy beam sea in the Lee channel, and even in the best and driest season a heavy swell undulates, if not actually breaks, upon the bar. Moreover, as this bar is, like most others, liable to changes, it is advisable to obtain local aid to cross it, or at any rate it would be well to examine it before crossing if local aid cannot be obtained.

Depths off-shore.—The discoloured water from the Nun river extends 4 miles outside the bar, and the 100-fathoms line lies 33 miles off-shore; a depth of 23 fathoms, over fine dark sand, will be found when 16 miles south-west of the bar.

Nun river above Akassa.—The only available channels for vessels proceeding above Barracoon point are through Alburka channel (which is entered immediately north of Barracoon point) and Louis creek, situated on the western side of the river, $6\frac{1}{2}$ miles north of Palm point.†

Between Louis creek, situated $6\frac{1}{4}$ miles north of the east entrance point of the Nun mouth, and Oguburi river (which joins the Nun on the western side at 42 miles above Trotter point), the channel, although

See chart No. 146.

* Proceeding to the Nun entrance from the Brass river, there is another point which comes on this bearing before Sengana point opens out, and which might be mistaken for it. Remark book, Navigating Officer, H.M.S. *Widgeon*, 1895.

† See Admiralty chart :—River Niger, No. 2776A; scale, $m = 1.0$ inch.

narrow, and in some places obstructed by islands, does not appear so liable to change, nor so difficult to navigate, as that part above Oguburi river.

Alburka channel has the deeper water, but its numerous sharp turnings prevent its being used when descending the river; H.M.S. *Ariel*, drawing $10\frac{1}{2}$ feet, passed through Alburka channel in August 1876. A wreck marked the tail of the spit extending from the southern Alburka island.

Louis creek.—In Louis creek the least water found in August 1877 was 10 feet; it is recommended when proceeding down the river to pass through this narrow channel during the flood stream, as the ebb runs strongly.*

Akau.—From Akassa the general direction of the river is N.N.E. for a distance of about 25 miles to Akau, a Niger Company's trading station; for 10 miles after passing Nicoll's islands, at the entrance of Louis creek, the river is only about 150 to 200 yards wide and flows through densely-matted forests of handsome mangroves; beyond this the mangroves give place to palm, bombax (cotton trees) and numerous other trees, growing to the water's edge, there are small clearings of bananas and sugar-cane, and occasional small groups of square mud huts on the bank.

The station of Akau consists of a mud and wattle dwelling-house and a couple of iron sheds. The country round is flat, swampy, and intersected by innumerable small creeks; numerous villages are scattered about the district, the inhabitants, chiefly belonging to the Oru or Idzo tribe and speaking the Brass language, have a very poor physique.

Bassa creek.—Three miles above Akau the Nun river is joined to Sengana river by Bassa creek.

Angiáma, is situated on the left bank of the Nun about 12 miles above Akan, and here the river increases in width, being fully a mile across in some places; above Angiáma at Otua the Nun river is joined by the Oguburi which unites the Forcados to this part of the Nun, and together with a creek opposite Sabogrega forms Wilberforce island. H.M.S. *Heron*, drawing 2 feet, proceeded from Otua to Sagbama on the Forcados by the Oguburi in September 1898 without difficulty when the river was high. In December 1897 when the tide was low it was obstructed by snags.

Ekole and Sabogrega, the former on the right and latter on the left bank of the river, are both stations belonging to the Niger Company; they are very similar to Akau, from which they are distant 28 and 35 miles respectively. The entrance to Ekole creek, between two sandy banks, is situated on the left bank opposite Ekole; this creek, which communicates with the Brass river, is available for steam launches drawing

See chart No. 2,776A.

* See plan of Louis creek on chart No. 2,776A.

4½ feet water. One of the hulks belonging to the Niger Company was moored off the entrance to this creek in 1895.

Here the downward current, in August 1877, was found running about 3 or 4 knots an hour.

Agberi.—The next station of the Company about 26 miles above Sabogrega is Agberi, also on the left bank; here the Oru country ends; the river widens considerably, and 5 miles further on the Forcados river, a magnificent sheet of water, about half a mile in width, is seen flowing away to the westward. The tide in the Nun river is perceptible until just below Agberi.

A hulk is moored at the entrance to the Forcados river.

Abo, another trading station of the Company, is situated on the right bank, about 22 miles above Agberi; the town stands about three-quarters of a mile behind the factory, and, during the floods, the streets become canals and communication is carried on in canoes. This town, in the Ibo country, was once large, but since the abolition of the slave trade it is of secondary importance and has little trade; the population is estimated at about 8,000. The natives are a healthy and well-developed people. At Abo and Ndoni, nearly opposite, the Delta of the Niger may be said to end, and the River Niger proper to begin.*

Ndoni is situated about 2 miles above Abo on the opposite bank; the anchorage between Ndoni and Abo is in 5 fathoms water.†

At Ndoni the river of the same name, also known as Onita or Oguta creek, flows in a south-easterly direction, with a breadth of about 100 yards, for about 15 miles, and then joins the Orashi river, which, rising in Ikutta lake, discharges, as the Engenni river, into the Sombrero and New Calabar rivers.‡

Ase is a trading station of the Niger Company on the south side of Ndoni river, and at the junction of the Ndoni with the Orashi a guard hulk is moored off Gregiani station; the native town of Omoko, the inhabitants of which are the wildest of any of the known Ibo clans, lies on a small lake of the same name a few miles east of Gregiani.

The Royal Niger Company's launch *Vigilant*, drawing about 3 feet water, proceeded down the Ndoni river, and then north up the Orashi river to lake Ikutta, which is about 30 miles from the junction of the two rivers; here the Company have a trading station on the south side, the native town of Oguta being on the north shore of the lake.§

See chart No. 2,776A.

* See Admiralty chart :—River Niger, No. 2,776B; scale, $m = 1\cdot0$ inch.

† The French vessel of war *Ardent*, drawing 7½ feet, floated from a bank near Abo in the Niger, and proceeded thence down the Forcados river to sea before the 29th June 1895.

‡ See chart No. 1,357.

§ There are wooding stations at Ogrugru, Ibaku, Oguta and Gregiani.

Ikutta lake is about 5 miles long in an east and west direction, and about $1\frac{1}{2}$ miles wide ; its shores are wooded, and in the rainy season a small stream runs into the north-west corner, and connects it with the Niger ; from its east end there is also a stream probably connecting with the Opobo river. The water of the lake is considered to be unwholesome, and if used for bathing purposes is said to produce skin diseases.

The *Vigilant* also visited the town of Idu, which is situated about 5 miles south of Gregiani on the left bank of the Orashi river, which is here about 200 yards wide.

On the 21st October 1883 the Niger expedition, which destroyed the town of Ida, proceeded from Barracoon point up the river for 195 miles to Ida, which took them four full days to accomplish, weighing anchor between 5h. 30m. and 5h. 45m. a.m., and anchoring between 6h. 30m. and 7h. 0m. p.m., proceeding at the rate of about 50 miles a day, steaming at an average speed of 7 knots an hour, which makes the stream run down at an average rate of rather more than 3 knots an hour. The shallowest water was in Louis creek where in one place a depth of 12 feet was passed over.

During the Niger expedition 1883 the maximum temperature on deck in the shade was 91° , which was at 4 p.m. ; the average temperature in the day was 84° and in the night 79° . Fever attacked nearly all who were engaged on that occasion, which may be accounted for by the fact that the river was at its highest while they were at Ida, but on returning it had fallen fully 3 feet, exposing a large extent of swamp and mangrove to the sun.

RIVER NIGER, one of the most famous of the African rivers, originates in several small streams which rise in the Kong mountains ; these mountains run parallel to the Guinea coast (about 200 miles inland), near the borders of Sierra Leone. These small rivers, the principal of which are the Tinkisso, Joliba, Milo, and Sankarani, unite just above Bammako, the first place of importance on the Niger, situated in lat. $12^{\circ} 40' N.$, long. $7^{\circ} 50' W.$ *

From Bammako the Niger runs in a general north-easterly direction for 450 miles to Timbuktu in lat. $16^{\circ} 40' N.$, long. $2^{\circ} 40' W.$, and the only tributary of any importance which joins it between those two places is the Mayel Balevel or river Bani, which unites with the Niger at Mopti in lat. $14^{\circ} 30' N.$

From Timbuktu the Niger flows in an easterly direction for 152 miles to Buram island, thence it flows south-eastward to Gomba in lat. $11^{\circ} 30' N.$,

See chart No. 1,357.

* See Admiralty chart :—River Gambia to cape Lopez and Anno Bom, including the Bight of Biafra, No. 594 ; scale, $d = 1.3$ inches.

long. $4^{\circ} 0'$ E., a distance of over 400 miles. At Gomba it is joined by the Sokoto river, and thence flows in a general southerly and south-easterly direction to Abo and Ndoni in lat. $5^{\circ} 32'$ N., from whence it spreads out into the Delta, an intricate net work of channels and creeks which discharges by many mouths over 200 miles of coast.

For descriptive purposes the Niger is usually referred to as the Upper, Middle, and Lower Niger. The Upper Niger comprises the river from its sources to Buram island; the Middle Niger from Buram to Jebba, in lat. $9^{\circ} 13'$ N., at the foot of the Busa rapids; and the lower Niger from Jebba to the sea.

The Upper Niger.—From its source to Buram island the Upper Niger varies considerably in width. At Bammako its width is estimated at 430 yards, and the depth at about 6 feet. Bammako is a place of considerable importance, possessing well built white buildings of rammed clay and roads bordered by trees.

Further down, the Niger, especially after its junction with the Mayel Balevel, shows a great tendency to split into different channels, often enclosing extensive tracts of country, and an exceptional inundation makes it into a large lake. This continues until below Timbuktu, when the river again becomes confined between banks, which at Tosei, just above Buram island, narrows its breadth to 150 yards, and increases its depth in proportion. At Buram island at the end of the Upper Niger, the river again widens to about 3 miles.

The Upper Niger is navigable from somewhat above Bammako to the first rapids, a little above Buram island, and the French have on it two gunboats and some armed barges.

The Middle Niger between Buram island and Jebba is much encumbered with rocks and rapids. Near Buram island the hills close in and form a sort of defile, but at Say the river again widens to 700 yards, with rocky banks 20 to 30 feet high on one side. Near Busa, where Park lost his life, the obstructions and rapids are numerous. A little above Busa (about 10 miles) the river is said to be 8 miles in width, but at Busa it is contracted to a very narrow pass, said to be only a stone's throw across; further down it again widens. At Moji, in lat. $9^{\circ} 10'$, the river turns abruptly to the eastward towards Rabba, and just past Moji is a remarkable rocky island, 300 feet high, named Kesey.

There are several important towns on the Middle Niger such as Say, Gomba, at the junction of the river Sokoto with the Niger; Busa, a large place walled on the side farthest from the river, where are fine cattle, sheep, and goats, whilst in the surrounding country are found deer, antelopes, Guinea fowl, pheasants, and partridges. Bajibo is also a large place, but is not well built.

See chart No. 594.

There are rapids at intervals in the whole course of the river from Jebba or Géba island, to about 8 miles above Busa, which are spoken of collectively as the Busa rapids. They are worst above Wuru, to which town canoes can reach, from below, at high river (September), but navigation cannot be considered as safe above Jebba. One light draught steamer has reached Wuru, but at great risk, and in 1898 H.M. gunboat *Heron* reached Bajibo.*

Above the Busa rapids there is a stretch of about 20 miles of very broad, slow running river, to about 5 miles below the town of Altona or Fogue, where the rapids of that name commence and extend for a distance of 15 miles, being succeeded by the same distance of navigable river. From the termination of this, about 10 miles below Yelo there are again rapids to about the same distance above that town, which is the capital of the Yauri province.

The navigation of the Middle Niger is very difficult, even for canoes, on account of the many rocks and rapids, and is impracticable for steamers; for although if placed on the river in the sections between the rapids they might be useful, yet all goods transported by them would have to be discharged and carried past each rapid and shipped again. The river is navigable to Jebba, 18 miles above Rabba, and river steamers have reached Bajibo, but from Jebba to Bajibo the navigation is very difficult.

When the Niger gunboat *Heron* proceeded to Bajibo in April 1898, the services of a canoe man, who knew the river below Jebba, were engaged, and by keeping men aft with poles to assist in directing the vessel's head the passage was safely navigated. On coming down the river it was more difficult, and it was necessary to drop through the more dangerous parts and have the services of a surf boat to weigh the anchors, &c.

On the Middle Niger there are Government stations at Busa, Liaba, and Bajibo. At Liaba a supply of wood is kept for river steamers.

The Lower Niger and Benue rivers.—From Jebba to Ndoni and Abo, where the delta may be said to begin, the Niger is navigable for steamers of very light draught (less than 2 feet) at all times. At Lokoja it is joined by the Benue, a noble stream, which rising in the mountains of Bubanjidda is navigable to Yola in lat. $9^{\circ} 10' N.$, long. $12^{\circ} 40' E.$, a distance of 400 miles above Lokoja. At their confluence the Niger is about three-quarters of a mile in width, and the Benue rather over a mile; the united streams resemble a lake, about 2 miles in width, dotted with islands and sand banks.

Level of the Niger.—The river Niger, like many other rivers, has a high and low level, but it has a peculiarity which is almost entirely

* See Admiralty charts :—River Niger, Nos. 2776 H, 1; scale, $m = 1.0$ inch.

confined to itself. Owing to its opening out at places into many streams, and then again converging into one stream, the rise in the Upper Niger takes a whole year to travel to the Lower Niger. This occurs in the following manner.

At the head waters of the Niger are the Kong mountains; heavy rain commences in February and continues until July, and the numerous streams thus formed converge just above Bamako; from whence to Diafaraba the river is not joined by any affluent of note. From Diafaraba to Timbaktu the Niger opens out into a series of small streams running through a flat country.

As the river above Diafaraba rises to its greatest height about July, it pours its waters over the plains between Diafaraba and Mopti, where it is joined by the Mayel Balevel, and reaches its maximum height in September; it then floods all the low-lying region between Mopti and Timbaktu, but retarded by the vast amount of country flooded the highest rise does not take place at Timbaktu until January.

From Timbaktu the waters are again collected into one stream, but the retardation is so great that it is not until the following July that the river reaches its highest point at Say, at which time the river is again in flood at Diafaraba and low at Timbaktu. On the lower Niger the river, above its junction with the Kuduna, reaches its lowest at the end of June, and the first rise takes place about the middle of July. The river reaches its highest level in the end of September. The Benue begins to rise early in June and the Kuduna in the middle of that month. The river falls during October, November, and December. During April, May, and June the navigation is difficult for steamers of even 2 feet draught.

From the following table which has been communicated by Sir G. T. Goldie of the Royal Niger Company, it will be seen that in the Lower Niger between Lukoja (near the confluence of the Benue) and the sea, the water is lowest in May and the beginning of June; between Lukoja and Rabba in June and July. The river below Lukoja begins to rise about the middle of June, and by the 7th July is usually sufficiently high to enable the ordinary river steamers to run. Above Lukoja the rise begins about a month later. The rise increases till the end of September, when the level remains more or less stationary until the middle of October, when it falls moderately.*

The great fall is about the last week in October, but a slight rise above this often occurs in January, then a slow fall until May or June.

The tidal influence appeared to extend about 25 miles within the entrance.

* The fall is generally at the rate of one foot per day. Every seventh year the rise of the river in the Delta is about 3 feet above the usual; the last occurrence of this was in 1893. Lieutenant F. W. Melville, R.N.

Places.	Distance in Miles from Nun River Entrance.	Period at which the River reaches its lowest Level.	The greatest Draught that can reach the Place at that Time.	Period at which the first considerable Rise takes Place.	The greatest Draught that can reach the Place at that Time.
LOWER NIGER—					
Abo - -	95	Middle of May -	5 feet	At the end of May a temporary rise and in the middle of June a permanent rise.	6 feet.
Asaba - -	139	May - -	5 feet	30th June - -	6 feet.
Ida - -	195	May - -	4½ feet	—	6 feet.
Lukoja at the confluence of the Benue.	237	May - -	4½ feet	June - -	6 feet.
Egga - -	315	June and July -	3 feet	End of July -	6 feet.
Rabba - -	417	June and July -	3 feet	End of July -	5 feet.
MIDDLE NIGER—					
Jebba or Geba -	433	June and July -	3 feet	End of July -	—
Bajiho - -	459	June and July -	Cannot be reached.	End of July -	Only to be reached from 15th to 30th Sept. in vessels drawing not more than 3 feet. Navigation dangerous on account of rocks above Jebba.
Liaba - - (50 miles below New Busa).	481	June and July -	Cannot be reached.	End of July -	Only to be reached from 15th to 30th September in vessels drawing not more than 3 feet.
Busa or New Busa.	525	June and July -	—	—	—
Busa rapids is the name given to all the broken water between the first rapid— at Jebba, about 20 miles above Rabba, and Busa.					
The BENUE RIVER tributary—					
Ibi - -	342	31st March -	1½ feet	1st June - -	4 feet.
Yola - -	520	March - -	1 foot	1st July - -	—

Places.	Period at which the River attains its maximum Height. Average maximum Rise.	The greatest Draught that can reach the Place at that Time.	Period at which the River begins to fall.	Period at which the great Fall commences.	The latest time Vessels of maximum Draught can remain.
LOWER NIGER—					
Abo - -	End of Sept. 30 feet.	12 feet.	About the first week in October.	Last week in October.	Last week in October.
Asaba - -	End of Sept. 30 feet.	12 feet.	15th Oct.	25th Oct.	10th Nov.
Ida - -	End of Sept. 30 feet.	12 feet.	10th Oct.	25th Oct.	1st Nov.
Lukoja at the confluence of the Benue.	First week in October. 35 feet.	12 feet.	10th to 15th October.	10th to 15th October.	25th Oct.
Egga - -	End of Sept. 16 feet.	12 feet.	About 10th October.	About 10th October.	10th Oct.
Rabba - -	End of Sept. 12 feet.	8 feet.	10th Oct.	10th Oct.	10th Oct.
MIDDLE NIGER—					
Jebba or Geba -	End of Sept. 12 feet.	5 feet. Safe navigation ends at Jebba.	10th Oct.	10th Oct.	10th Oct.
Bajibo - -	End of Sept. 12 feet.	3 feet.	5th Oct.	5th Oct.	5th Oct.
Liaba - - (50 miles below New Busa)	End of Sept. 12 feet.	3 feet.	About 5th Oct.	5th Oct.	5th Oct.
Busa or New Busa.	River not navigable to Busa on account of rapids.				
The BENUE RIVER tributary—					
Ibi - -	20th Sept. 30 feet.	12 feet.	1st Oct.	Middle of October.	10th Oct.
Yola - -	Middle of Sept. 18 feet.	10 feet.	End of Sept.	Middle of October.	End of Sept.

Trade.—The trade on the Niger river appears to be rapidly increasing; below Onitsha the chief export is palm-oil, and above it ivory.

Supplies.—Sheep, goats, fowls, eggs, yams and onions can generally be obtained, and the West African frontier force has a regimental farm at Jebba; fresh milk may be procured at certain places, especially between Shonga and Rabba.

Navigation of the Niger above the Delta.—The successful navigation of the river depends entirely on local knowledge, and it would be well for all strangers to employ pilots, or canoe men, well acquainted with it. The channels are constantly changing, and snags are frequently met with. The current varies from an average of 3 knots in October, November, and December to 2 knots in April. The wind is generally blowing up the river, or against the stream so that when at anchor the vessel is stern to wind.*

Principal towns and trading posts on the Niger above the Delta.—Atane, lat. $6^{\circ} 1' N.$, long. $6^{\circ} 41' E.$ Between Abo and Atane, a distance of about 30 miles the river rolling down from the north, in one vast expanse, presents a noble appearance; the banks are flat and covered with tall guinea-grass, amongst which may be seen the low mud Ibo dwellings, surrounded by their little plantations of yams, bananas, and sugar cane, while immense cotton trees (bombax) rise up at intervals among the grass, and luxuriant creepers and orchids hang over the banks.†

About 12 miles above Abo, on the same bank, is Opai, the Company's trading station, and nearly midway between Abo and Atane, are the trading stations named Utshi and Munakor: the former on the right and latter on the left bank. All these are trading ports where wood for steaming purposes may be procured.

Atane, also a station of the Niger Company, is an important oil market, being the centre of a large palm-oil-producing district; the trading is chiefly carried on by women.

Abutshi.—From Atane to Abutshi the distance is about 8 miles, and between is the trading station of Odekwe, all situated on the left bank. The trading and wooding station of Abutshi is picturesquely situated on an overhanging cliff, festooned with dark-green creepers, and the iron store sheds line the river bank, the agent's house standing back with an avenue of palms leading to it. Here is a well-kept garden containing fruit and flowers, and in the vicinity cocoa, coffee, and pine apples are grown, and there are a few cattle and horses. Abutshi is one of the largest

* The most considerable variations in the bed of the river, and channels, from the existing charts are at the junction of the Forcados and Nun river; between this and Abutshi; and between Beaufort island and Lukoja. Lieutenant F. W. Melvill, R.N., H.M.S. *Heron*, 1898.

† See chart No. 2,776B.

stations of the Royal Niger Company and the commercial headquarters of the Igara district. The native town of Abutshi, situated a few miles inland, is inhabited by a wild and lawless people.

Onitsha.—About 2 miles above Abutshi, and on the same bank, the Onitsha factory of the Niger Company, stands close to the water's edge and is surrounded by fine baobab trees. The French mission station is a short distance above this, but the mission house of the Church Missionary Society is between two and three miles from the river and close to the native town of Onitsha.*

The first high land after entering the river is seen about Onitsha, which town was burnt by H.M.S. *Pioneer* in 1879; it is now a quiet and flourishing place. At Onitsha the width in August 1877 was about 1,200 yards, with deep water on the eastern side of the channel.

Anchorage.—A vessel should anchor nearly abreast the landing shed and westward of a line joining two cotton trees, situated north and south-west of the landing place. The stream runs at rates of from $3\frac{1}{2}$ to 5 knots an hour. It is not safe for vessels, drawing 10 feet water, to remain at Onitsha after the end of November, and the river steamers, drawing from 6 to 8 feet, lay up about that time.

Between Onitsha and the Mohammedan town of Egga, a distance of 180 miles, the navigation is difficult, the channel being obstructed by rocks and the current running swiftly.

Asaba.—On the right bank, and about 3 miles above Onitsha, is the administrative headquarters of the Royal Niger Company. The European portion of Asaba lies between the native town and the river, and consists of the civil and military stations. The barracks of the constabulary are about 100 feet above, and facing, the river. There is a parade ground, officer's quarters, and mess room, and the Roman Catholic mission stands between the barracks and the native town.

Supplies.—Bullocks may be obtained at Asaba, and an experimental garden has been started, but the soil is not so good as at Abutshi. Wood for steaming purposes can be obtained.

The river Amamzara, a small tributary of the Niger, enters that river nearly opposite Asaba; it is from 200 to 300 yards wide at its mouth, and well wooded down to the water.

There are three trading stations belonging to the Niger Company on this river. Gloria-Ibo, the first, is a picturesquely-situated little place with a factory standing about 100 feet above the river, and is said to be healthier than most of the stations of the Lower Niger district. Igbaku, the second, is situated on the left bank, the native town inhabited by Ibos being a mile or more inland. Ogrugu, the northern of the trading posts on the Amamzara river, is about 50 miles from the entrance; it stands at an elevation of 80 feet above the river, and is said to be fairly healthy.

* See plan of Onitsha on chart No. 2776b.

The steam launch *Vigilant*, belonging to the Royal Niger Company and drawing 3 feet water, ascended the river to Ogrugu.

Ida, latitude $7^{\circ} 6' N.$, longitude $6^{\circ} 42' E.$ Between Asaba and Ida, on the right bank, are the small trading stations of Illah and Illushi, the former situated on the edge of a deadly looking swamp, and here, on the opposite bank, commences the country of the Igaras. The trade of Illah and Illushi chiefly consists of rubber and gum copal, the latter a valuable product. The above are all wooding stations.*

At Ida, about 45 miles above Illushi, the river is narrowed by islands in the centre, being about 700 yards broad on the side of the town.

Ida is an important town in the Igaras country; it is large, and picturesquely built on red cliffs, about 200 feet high, which overhang the river, the huts are generally circular in shape and constructed of grass, with little plots of cultivation shaded by large trees and dense green undergrowth. It is the northern town in Southern Nigeria.

Anchorage.—There is anchorage off the town of Ida in 8 fathoms water; the current runs about 3 knots an hour.

Products.—The products of the stations, south of Lukoja, are confined almost entirely to palm oil, kernels, and rubber, though a small trade is done at some places in pepper, copra and gum copal.

Dangers.—In the intermediate rocky region between Ida, 200 miles above the bar, and Lukoja 43 miles farther north, the existence of several dangers has been reported, and it should be remembered that from the annual changes in the bed of the Niger, the channel of one year is frequently useless for another.

Lukoja, about 43 miles above Ida and situated on the river bank at the foot of Mount Patteh is essentially a modern town, peopled by no particular tribe, and having an everchanging population; the only permanent residents, and those not numerous, are the employés of the Royal Niger Company. This is the first Mahommedan-peopled place met with in the river.†

Situated at the junction of the river Benue with the Niger, it forms a convenient place for traders, from all parts, to meet and exchange their goods, and is therefore one of the most important centres of the Royal Niger Company. The town does not cover any great extent of ground, the round grass huts being packed close together with a few narrow lanes between them.

Mount Patteh rises 1,200 feet above the river, and is at its summit an almost level plain, about $1\frac{1}{2}$ miles in length, and from 3 to 4 in breadth; it

* See Admiralty chart:—River Niger, No. 2776c; scale, $m=1.0$ inch, and view on chart No. 621.

† See Admiralty chart:—River Niger, with plan of Lukoja anchorage, No. 2776d; scale, $m=1.0$ inch.

is well wooded, in the dry season well stocked with deer and other game, and commands extensive views of the surrounding country.

Communication is maintained between Akassa (at the mouth of the river) and Lukoja by steamers and steam launches, but the communication from Burutu is more certain. Above Lokojo communication is maintained on the Benue as well as on the Niger by shallow draught steamers and steam launches. A telegraph is laid to Jebba (viâ Egga) which is in telegraphic communication with Lagos, and consequently with the British islands.

Supplies.—Sheep, goats, fowls, eggs, yams and onions, and occasionally beef may be procured, and wood for steaming purposes obtained.

Sosso Kuso, about 21 miles above Lukoja, is a small but pretty trading station, situated on the right bank, in a grove of lofty palms at the foot of a range of forest clad hills.

Egga.—From Sosso Kuso to Egga the distance is about 53 miles, and on the left bank, about 20 miles from the former place, is the small trading and wooding station of Sokun.*

The town of Egga, with a population of at least 6,000, half Mahommedan and half pagan, is an important commercial centre, being the meeting place for traders from the Upper Niger, Kano, Ilorin, and many other large districts; it stands on a low sandy spit of land. The huts are huddled together regardless of any order; the lanes are narrow and filthy; in the wet season parts of the town are inundated by the river, and the whole place gives forth a stench which, at times, is unendurable; there are a few, rough, barn-like mosques. It is in telegraphic communication with Lukoja and Jebba.

The factory of the Niger Company, consisting of excellent quarters for the agents, with rows of iron store-sheds on either side, overlooks the river, and is surrounded by a high wall. Wood for steaming purposes can be obtained.

Wanangi river.—About 8 or 10 miles above Egga on the north bank is the entrance to the river Wanangi, and at a distance of about 35 miles up this river is the town of the same name, consisting of conical-shaped huts, constructed of grass, and standing on the edge of the river; it contains about 1,500 inhabitants, and is the port of Bida, the Nupe capital.

The Royal Niger Company's S.S. *Soudan*, a small steamer about 120 feet in length, and drawing $5\frac{1}{2}$ feet water, ascended this river to Wanangi, but owing to the sharp bends, she took the ground on several occasions, and the boughs of the overhanging trees did a great deal of damage in carrying away awnings, stanchions, &c.

The British expedition to Bida, 1897, crossed the Niger at Egbom, about 25 miles west of Egga, and found the river at that place to be 850 yards in breadth.

* See Admiralty chart :—River Niger, No. 2776e; scale, $m=1\cdot0$ inch.

Egbag.—From Egga the direction of the Niger is about W.N.W., and at 31 miles is Egbag, situated in a dismal-looking swamp; the trade at this place is poor, the principal articles being shea butter, hides, kernels, pepper, and rice.*

At a distance of 42 miles above Egga the Niger is joined by Kudúna or Lafun river. The company's steam-vessels navigate up to the rapids of Busa, 108 miles above Rabba and 210 miles above Egga.

Shonga is a trading station recently (1898) established, situated on the right bank of the river in the elbow below Rabba. Pasha is 5 miles below Shonga.

Rabba.—From Egbag the direction of the river is about north-west to Rabba, a distance of 50 miles. Rabba, formerly the capital of Nupe and the burial place of its kings, is now little more than a village; the red cliffs above the town, walling in the water of the river, and the white walls of the Company's factory relieving the monotony of the clusters of small grass huts, studding the undulating country, make it one of the most picturesque places on the river. The trade consists of shea butter, hides, kernels, gum arabic, Igara kernels, pepper, and rice.

Above Rabba the Royal Niger Company have stations and military posts at Jebba; at fort Goldie, on the right bank, opposite the town of Bajibo in lat. $9^{\circ} 23' N.$, long. $4^{\circ} 29\frac{1}{2}' E.$; and at Liaba, on the right bank, about 22 miles above fort Goldie.

Communication.—Fort Goldie is in telegraphic communication with Jebba.

Jebba is the head-quarters of the West African frontier force, and a place of considerable importance, as here the caravans from Kano and Sokoto cross the Niger on the way to Ilorin and Lagos. There is a health station at Jebba. Just above Jebba is a remarkable rock in the river, 300 feet high, named by Landor, Mount Kesey. Wood for steaming purposes may be obtained at Pasha, Rabba, Lar, Jebba, and Liaba.†

Communication.—Jebba is connected by telegraph with Lagos, Ilorin, Ogbomostro, Fort Goldie, Egga, and Lokoja.

BENUE RIVER.—This river, which joins the Niger immediately below Lukoja, rises in Adamawd, in about $7^{\circ} 10' N.$ latitude and $13^{\circ} 20' E.$ longitude. In the upper part of its course it is separated by a narrow water parting from the head streams of the Lagone or Serbeari. For the first 100 miles it remains a rocky mountain stream, but after being joined by the Mugo Kebbi takes a westerly direction, and becomes

* See Admiralty chart:—River Niger, No. 2776*f*; scale, $m = 1.0$ inch.

† See Admiralty charts:—River Niger, No. 2,776*h*; scale, $m = 1.0$ inch, with plans of Moji passage, Buka passage and Tangbogi rapids; also River Niger, No. 2,776*i*; scale, $m = 1.0$ inch, with plan of Bajibo anchorage.

navigable for boats drawing about 4 feet. At its junction with the Niger it is about about a mile in width.*

It has been ascended by the officials of the Royal Niger Company, until it becomes an unnavigable stream, flowing among the rocks of the Bubanjidda mountains, and Flegel, in 1882, camped near its source, in lat. $7^{\circ} 33' N$. It is a curious fact that the dates of the annual rise and fall of the river appear to correspond with those of the Nile.†

The river bed is subject to changes, from the continual shifting of the sand banks, and during the dry season, when the Benue is not navigable for anything larger than launches, the Company's officials, in their frequent canoe trips from station to station, examine the channels; a few of their native employés are trained as pilots.

Mozum, the first station of the Company on the river, and about 7 miles from the Niger, is situated on the left bank, which is here fringed by baobab trees; the trade is principally in india-rubber and gutta-percha, and the inhabitants are chiefly Bassas.

Bofa, about 10 miles above Mozum, also on the left bank, is a very dirty village, consisting of a number of round grass huts, erected close to the water; the trade at the station is principally in rubber and gutta-percha. Here also the inhabitants are mostly Bassas, but all this part of the river is sparsely populated.

Loko, about 55 miles above Bofu, and situated on the right bank is a clean town, with a population of about 4,000, and, as the port of the Mahommedan state of Nassarawa, has some importance. Here the Niger Company have a large trading station.

At 15 and 30 miles respectively from Loko are Odeni and Arago, both Company's trading stations, situated on the right bank, the trade at the former being rubber and gutta-percha, and at the latter gutta-percha and benni seed. Abinsi, on an island, is another trading station about 33 miles from, and has the same articles of trade as, Arago; the town is surrounded by a mud wall, and the inhabitants, who are Jukos, are agriculturists and fishermen.

About 5 miles east of Abinsi, the Katsena-Allah river discharges on the south bank. Here the country becomes more open and freer from forests, with patches of grass sometimes 7 feet in height; when this dies down, in the dry season, the country swarms with game, the deer roaming about in large herds. The river flows through the heart of the Mitshi country, and on the east bank, 45 miles within the entrance, is the trading station of Palava; about 80 miles above Palava the Niger Company have another trading station named Katsena-Allah.

* See Admiralty chart:—Rivers Niger or Kwara and Benue or Chadda, No. 2,446; scale, $m = 0.25$ inch.

† Wood for steaming purposes may be obtained at the following places on the Benue river:—Mozum, Amarán, Amagede, Arago, Abinsi, Ibi, Donga, Jiru, Lau, Dju, Bula and Yola.

About 11 miles east of the entrance to the Katsena-Allah river, and on the same bank, Mount Herbert, a solitary hill covered with verdure, rises to the height of about 400 feet straight from the plain.

Ibi.—Between Loko and Ibi, a distance of about 127 miles, the natives on both banks are treacherous, especially the Mitshis on the south side. Ibi is an independent Juko town; Wukari, the capital, being situated about 35 miles south; the Jukos are pagans, and speak Hausa as well as a language of their own. This is the headquarters of the Niger Company in the Benue, and in addition to the various store sheds there is a cool thatched bungalow, surrounded by a well-kept garden.

Above Ibi the river still continues a magnificent stream, more than a mile in width; on the north bank is the Muri kingdom, and on the south, after passing Zhibú, a trading station, and the mouth of the Donga river, the Bakundi kingdom commences.

Donga river.—The Donga river is entered about 4 miles east of Zhibú, the land near the entrance being low and swampy, with a few large trees scattered about amongst the high grass, and here, with a high river, this stream is about 300 yards wide, but in the dry season is unnavigable for anything but canoes. Donga, a Juko town, is situated about 60 miles from the entrance on the east bank; it contains from 4,000 to 5,000 inhabitants who are pagans, and has a factory belonging to the Niger Company close to the river and outside the wall of the town. Trade is not very prosperous, and is confined chiefly to rubber and gutta-percha. The Royal Niger Company's launch *Benue*, drawing 15 inches water, ascended this river to Donga.

This part of the Benue has few villages or inhabitants, and is densely wooded with occasional open plains of high grass.

Terraba river.—About 40 miles above the Donga river and on the same bank is the entrance to the Terabba river, which, flowing in a north-west direction, discharges itself into the Benue through three or four mouths, the principal outlet being not more than 150 yards wide, but above this the river opens out to about three times that width, but again narrows higher up; the banks are fringed with high reedy grass.

There are a few villages on both banks of the river, the largest being Sindidri on the left bank, where the Niger Company have a large iron store-shed as a dépôt for Bakundi; here the people are Fulas.

A few miles before reaching Bakundi, the Albemarle mountains slope down to the river on the right bank, and a little higher up there is another range on the left bank. Bakundi, about 35 miles from the entrance to this river, is a large and scattered town with about 5,000 inhabitants; the Niger Company's trading station is built on the edge of the town, and

between it and the river; the trade is in ivory, which is said to be declining.

Mainaraiwa, about 45 miles above Eliza island, and situated on the left bank, is one of the Company's wooding-stations, and here are three very large Baobab or monkey bread-fruit trees;* a mile farther up the river there is a trading station, and the small river and Muri village of Mainaraiwa; the inhabitants of the latter, professing Mahommedanism, are wild, uncivilised, but not numerous. The chief trade of this place is in gum arabic.

Between Eliza island and Mainaraiwa the country becomes more open, and here there are numbers of Dum palms,† not previously seen among the other trees; in the distance low ranges of hills break the hitherto monotonous outline of the forest.

Lau, on the left bank, about 18 miles above Mainaraiwa, is a small branch trading station; large quantities of tin, apparently of good quality, are collected from streams near the hills and brought into this station, and the agent of the factory professes to have found between sixty and seventy different kinds of gum in the district.

Djen.—After leaving Lau the scenery becomes very fine, ranges of hills appearing on both sides; on the north the Muri range, some 6 or 7 miles from the river, rises to a height of several thousand feet, and on the south, distant about 15 miles, is the Fumbina range; this part of the country is very thickly populated and completely unexplored on both sides of the river. Djen is a small pagan town, situated on the right bank about 10 miles above Lau.

Numan, a prettily-situated village and trading station on the south bank, is about 25 miles above Djen; it is surrounded by cultivated land, millet, cassava, and Indian corn being grown. Yola, about the same distance above Numan and on the same bank, is on the borders of the kingdom of Adamawa, a Mahommedan dependency of Sokotu. Above Yola the scenery of the river varies considerably, sometimes hills sloping down to the very riverside, at others vast expanse of swamp, studded with large trees, while a little further on the river flows through black walls of forest, above which, in the distance to the south, may be seen the tops of the mountains of Alantika rising to a height of about 8,000 feet.

About 40 or 50 miles above Yola, the Benue is joined by the Faro flowing from the south; with a high river at its entrance it exceeds the Benue in width, but is far shallower and cut up with numerous small

* *Adansonia digitata*, the bark of which yields a fibre, making good rope, and the fruit, resembling the loofah when crushed and dried, an excellent substitute for a sponge.

† Deleb or Palmyra.

islands. Beyond this, after passing the village of Tepe on the north bank, the Benue narrows, in some places being not more than 300 yards wide, and flowing with a rapid current through dense jungle close to the water's edge, has in the channel a depth of 16 fathoms.

Garua, the farthest station of the Royal Niger Company on the Benue river, is a small but clean town, situated on the north bank, probably about 30 miles above the junction of the Faro with the Benue; the country round is fairly well cultivated, but being flat is subject to flooding during the wet season; large herds of cattle and some good-shaped little horses are kept by the Fulas. Here the river is about 600 or 700 yards wide, and 6 to 7 fathoms deep in the channel at high river. This is the highest point reached by the Company's S.S. *Boussa*, a stern-wheel vessel of about 400 tons, drawing 5 feet water when loaded.

Kebbi river, supposed to rise in the Tuburi marshes, and entered about 10 miles east of Garua, is about 250 yards wide at the entrance; here the Benue, which now takes a southerly direction towards its source, is upwards of 600 yards wide. The average depth in the Kebbi at high river is from 10 to 12 feet.

The small stern-wheeler, *The Benue*, belonging to the Niger Company, about 60 feet in length and drawing 15 inches water, ascended the Kebbi, in September, against a 4-knot current, to what was a lake or large marsh at high river. This lake, named by the natives Nabara, was about 3 miles long by 2 miles wide, with a very large village (Bifara) on its north shore. It was found impossible to reach this village, as the stream was not more than 2 feet deep and from 15 to 20 feet wide.

Between the entrance of the Kebbi and Nabara lake, several villages were passed, the inhabitants being Mahommedans of the Fulbe tribe, but about 5 miles below the lake a deserted strip of country was passed through, after which the inhabitants were found to be Pagans.

There were patches of cultivation on both banks, and some ranges of mountains from 1,500 to 2,000 feet high; a short distance from the entrance, Mount Katie, about 800 feet high, well wooded to the summit and situated from 5 to 6 miles from the river on the south bank, is a noticeable feature, and from its isolated position served as an excellent point on which to take angles for mapping purposes.

CHAPTER XIV.

CAPE FORMOSO TO RIVER CAMEROON—BIGHT OF BIAFRA.

 VARIATION in 1900.

Cape Formoso	-	15° 00' W.		Cameroon river	-	15° 15' W.
Bonny River	-	14° 30' W.				
Decreasing about 5' annually.						

CAPE FORMOSO, the eastern limit of the bight of Benin, is also the western boundary of the bight of Biafra. The line of coast from it to the Rio de Rey, where the shore turns abruptly to the southward, trends E. by S. for 170 miles, and is almost flat, appearing of a dark colour. It is intersected by several rivers, of which the more important are the Bonny, the New and Old Calabar, and the Rio del Rey. These are, however, generally difficult of access, each being obstructed by a bar at its outlet. (*See Chapter I., page 20, for further general information.*)*

Cape Formoso, which is low and wooded, forms the extreme southern extension of the Delta of the Niger, Kworra, or Kwára river. From cape Formoso the coast forms a slight bay for about a mile, and then trends E. by S. $\frac{1}{4}$ S. to West point, $3\frac{1}{2}$ miles distant.

Tides.—It is high water, full and change, at Cape Formoso at 4h. 8m. ; springs rise about 6 feet.

BRASS RIVER, also known as the Rio Bento or St. John, is situated 9 miles east of Palm point, and 4 miles east of cape Formoso, midway between the Nun entrance and west point of Brass river there are two trees, close together, which may be seen over the bush. The Brass river is formed by several branches of the main Niger, one of which, Ekole creek, is navigable for steam launches of $4\frac{1}{2}$ feet draught.†

The entrance to Brass river, three-quarters of a mile wide, lies between two points, which when bearing N.N.E., appear well defined, the trees on the western point being more rugged and lower than those on the eastern point; when bearing about N.N.W. an opening, having the appearance of an arch, is seen in the trees on East point.

* *See Admiralty chart :—Africa, West coast, sheet xix., cape Formoso to Fernando Po island, No. 1,357 ; scale, $m = 0\cdot12$ inch.*

† *See Admiralty plan :—Brass river on chart No. 146 ; scale, $m = 2$ inches.*

Within the entrance points, the river expands to 2 miles in width abreast the factories, which breadth it maintains as far as Opolobo or Big island, situated nearly in the middle of the river, 4 miles from the entrance.

In 1838 the boats of H.M.S. *Viper* ascended Brass river for about 60 miles, and found it 400 yards wide and 9 or 10 fathoms deep, its banks fringed with impenetrable mangroves. On returning they kept along the western shore with a favourable current running 7 knots an hour.

Settlement.—The consulate is situated, on the east bank of the river, a little more than a mile inside East point, and factories extend for more than half a mile on either side of it; this is the headquarters of the Niger Coast Protectorate. The mission house, situated 200 yards from the beach, is the most southern building, being a quarter of a mile from East point, and the telegraph station, the most northern, is $1\frac{3}{4}$ miles from the same point.

Communication.—The steamers of the African S.S. Company call here fortnightly, and those of the British and African Company monthly. Local steam vessels, with mails, run from Bonny weekly, being due two or three days after the outward-bound mail steamer arrives at Bonny. Telegraphic communication with Accra and Bonny.

Supplies.—Bullocks, a few fowls, and eggs may be procured at Tua town. Fresh water depends on the supply the resident traders have for themselves. Rain water is used for drinking, the well water not being recommended. A doctor generally resides at the factories.

East point.—The eastern entrance point is densely wooded, the trees extending close down to the water's edge, the sand being gradually washed away by the current, which sweeps round the point with great velocity. The edge of the bush shows as a distinct bluff (slightly cut away near the bottom) from nearly all directions, owing to the sharp elbow formed by the junction of the eastern river bank extending to the south-westward in nearly a straight line, and the line of that coast trending in a S.E. by E. direction for $2\frac{1}{2}$ miles.

West point.—The western entrance point, $1\frac{1}{2}$ miles south-west from East point, is low and sandy, the edge of the bush being 300 yards from high water mark; it appears to be extending to the south-eastward. Though this point is a well defined elbow, yet from its situation with reference to the entrance, it is not so clearly distinguishable from a distance as East point.

From West point the line of coast to the northward trends N. by E. $\frac{1}{4}$ E. for one mile, and forms the right bank of the river, it then turns to the north-westward (forming a bay $1\frac{1}{4}$ miles long and one-third of a mile deep)

to Akassa creek, $2\frac{1}{2}$ miles within the entrance. From the point at the mouth of Akassa creek, the right bank of the Brass extends north-eastward to above Opulobo island.

Landmarks.—There are a number of dried trees on West point which have a very ragged appearance in contrast to those on the east side, and assist to identify the river; the tree tops on the east side are almost of a uniform height, with no noticeable clumps, except one known as the Haycock (which it somewhat resembles), 4 miles east of East point, and another very remarkable tree with spreading branches, two-thirds of a mile further to the eastward. On the west side, Join tree on cape Formoso is remarkable, and also a clump situated $2\frac{1}{2}$ miles westward of West point.

Western spit.—This sand spit extends in a southerly direction from West point for $1\frac{3}{4}$ miles, with only a depth of one or two feet at low water, spring tides, and always breaks very heavily; the eastern edge is nearly straight and “steep-to.”

Western breakers are the continuation of Western spit, curving round to the E.S.E. for $2\frac{1}{2}$ miles further, and forming the bar. The shoalest spot is on a large patch, 4 cables long by $1\frac{1}{2}$ cables broad, having only 4 feet at low water on its eastern edge, and is situated $3\frac{1}{2}$ miles, S. $\frac{1}{8}$ W., from East point, and $2\frac{3}{4}$ miles, S. by E. $\frac{3}{4}$ E., from West point.

There are two smaller heads with 5 and 6 feet water, situated 3 cables and 8 cables respectively N.W., and N.W. by W. from the large patch.

The general depths to the westward of these shoal heads are from 7 to 9 feet, and to the eastward from 8 to 12 feet; generally the further east, the deeper the water found.

The patches, above mentioned, break occasionally at high water, even in the finest weather, and the whole bank breaks heavily at half ebb.

The outer edge of the western breakers is steep, falling suddenly from depths of 6 and 8 feet to depths of 16 feet or more. The bottom is always of sand on the breakers, and of mud immediately outside them.

Hartley Bank.—This small detached sand-bank, having 11 feet over it at low-water, and forming the north-east extreme of the Western breakers, is situated $3\frac{1}{2}$ miles, S. by E. $\frac{5}{8}$ E., from East point, and 3 miles, S.E. $\frac{1}{2}$ S., from West point. In the rainy season there is always a very heavy break on this bank, and it is reported to be extending to the eastward.

Shore spit.—From East point, off which shoal water extends $1\frac{3}{4}$ cables, the line of shallow water (which breaks or not according to the state of the weather and tide) has a south-south-east direction for one mile, and then turns south-east for 2 miles further, maintaining a distance of about 6 cables from the coast. From this point it projects to the south-

westward towards the line of Western breakers under the name of the Shore spit, the south-western extremity being situated 3 miles, S.E. $\frac{3}{4}$ S., from East point, and one mile, N.E. $\frac{3}{4}$ N., from Hartley bank.

The Shore spit breaks in fine weather at half ebb, and there are always heavy rollers upon, and to the southward of it, within the influence of which it is dangerous for a vessel, particularly a sailing ship, to get, as both ebb and flood streams set towards the spit.

Buoy.—A buoy is sometimes moored off the bar on the line of the leading mark for entering, but no dependence should be placed on finding one here. See Caution; buoyage, page 33.

Outer anchorage.—Vessels arriving off the Brass river should anchor in 6 fathoms water, with West point bearing about N. by E.

Inner anchorage.—Vessels anchor in 4 fathoms water over mud, off the factories near Tua creek, about $1\frac{1}{4}$ miles above East point, and a third of a mile from the shore, taking care to have West point open so as to get as much of the sea breeze as possible. Vessels are very liable to foul their anchors, and drag on a strong ebb stream.

H.M.S. *Thrush*, 1893, anchored about half a cable off the Consulate pier, and found 3 fathoms water within 50 yards of it.

Pilots.—From the outer anchorage neither houses nor shipping can be seen, and as the report of a gun is not readily heard at that distance from the shore, a vessel requiring a pilot must generally send a boat for one.

Should, however, the usual signals be recognised, a pilot will come off as soon as the bar is practicable. The best pilots are the masters and officers of the local steam-vessels.

Bar.—Between these rollers off Shore spit and the Western breakers, a distance of nearly one mile, there is a channel with depths of from 13 to 14 feet at low water, spring tides. The bottom is of hard sand on the bar, changing to soft mud on either side.

Occasionally, in the wet season, the bar breaks all over, but generally in the dry season the channel is comparatively free from actual breakers during the last half of the flood, though there is usually a long swell. Ordinary boats cannot cross the bar of the river except in fine weather.

Greatest draught.—Vessels, drawing over 16 feet water, should not attempt to cross. Ships usually load to a draft of $14\frac{1}{2}$ feet, and never above 15 feet.

Directions.—The best time to cross the bar is during the last quarter of the flood; entering before half flood, there is every probability, especially in the rainy season, of meeting a strong ebb stream.

See chart No. 146.

A range of hills on the west side of Brass river a short distance inland, terminates in a well-defined shoulder on which are three distinct bushy trees, this, kept well shut in of East point, bearing N. by W. $\frac{3}{4}$ W., leads over the bar (which is here 6 cables in width) in 13 feet at low water, passing one cable eastward of the Western breakers and of Hartley bank.

On this bearing, a peculiar hole in the bushes, just inside East point, is noticeable, and is of itself a good guide, should the shoulder of the hills be obscured. When a remarkable cotton tree, the branches of which are fan-shaped, or the northern clump of dried trees on West point, bears N.W., showing that the Hartley bank is passed, the water should have deepened to 16 feet at low water, and the bottom changed from hard sand to soft mud; the trees may then be steered for on a N.W. course, passing about half-a-mile from West point, when the channel will be fairly open, and course may be altered to N. $\frac{1}{4}$ E. in mid-channel, giving East point a berth of one-third of a mile.

The shore is "steep-to," northward of West point, and so also is the eastern side of Western spit, which may be approached with safety. Both flood and ebb streams set strongly towards the eastern shoals; therefore vessels keep nearer the west side on entering, which also brings the sea more end-on.

In the rainy seasons the river entrance is often obscured by thick weather, even when in 5 fathoms water.

Akassa creek, entered $1\frac{1}{2}$ miles north-west of East point, on the western bank of Brass river, affords communication between that river and the Niger, available for vessels of 4 feet draught, but some very shallow flats have to be crossed, and here the tidal streams from the Niger and Brass meet and separate, and the navigation is difficult; at this part a minimum depth of $4\frac{1}{2}$ feet was obtained in 1895.

This creek is principally used by launches, of light draught, which take the mails, &c. between Akassa and Brass; they generally enter it at half-flood.

Boats can cross the flats in Akassa creek not later than three-quarters tide. A favourable tide will be carried through all the way by taking care to arrive on these flats at about high water, the ebb tide running out through both eastern and western arms of the creek.

Tua creek.—This small creek on the eastern bank, one mile above East point, leads to Tua town, a large native village one mile inland.

Akwamobugo or Fish town creek is entered on the left bank about 4 miles above the Consulate; it has a southerly direction for $5\frac{1}{2}$ miles, then westerly for $2\frac{1}{2}$ miles, with several bends to Fish town, and has depths of 16 to 18 feet at high water below Fish town; its general width is about a cable, but it is exceedingly narrow in places.

* See Admiralty chart:—Brass river and creeks, No. 1,369; scale, $m = 1.0$ inch; also chart No. 2,776A.

Nimbi creek is entered about 17 miles above East point, and the Brass river to the entrance of the creek presents no great difficulties in navigation for vessels of 15 feet draught, but Nimbi creek is only about from 40 to 50 yards in width, and has very sharp turns in it. Light draught vessels ascend to Sacrifice island steam launches and boats can get to Bassambri.

Immediately northward of Opolubo island a flat having a depth of $14\frac{1}{2}$ feet at low water, spring tides, extends right across the river.

Directions. — Leaving the anchorage off the Consulate, steer N.E. by N., to pass about 3 cables east of Opolubo island, and towards the low eastern entrance point of Ekole creek; a shoal, with snags on it, extends about 3 cables south of the point, and a long narrow bank, which dries at low water, lies about half a mile south-east of it; the channel lies between this bank and the point, keeping close to the east side of the latter.

About 2 cables beyond the low point, there is a small creek, and from this the course is E. $\frac{1}{2}$ N. for a gap in the bushes on the opposite side of the river; this gap has low trees on its northern, and high trees on its southern, side, and the course, allowing for the tidal streams which here run strongly, leads mid-way between the bank which dries at low water, already mentioned, and a long narrow bank, drying at half ebb, and extending about $1\frac{1}{4}$ miles from the north bank.

When about half a cable from the east bank of the river, the course should be altered to N.E. $\frac{1}{2}$ N. for 2 miles, passing at about three quarters of a mile above the gap, the entrance to Fandrobeta or Upper Fish town creek, which is large; the entrances to two smaller creeks will be seen on the west bank.

As Bush point is approached, the east bank should have a berth of at least 3 cables from about half a mile south of the point, then steer across till about $1\frac{1}{2}$ cables from the north bank of the river, and when Bush point bears S.E. $\frac{1}{4}$ E. gradually round to the eastward keeping a little more than a cable from the north bank; after passing the east point of Itcatoholu (Monkey) island, gradually alter course to the northward, keeping about the same distance off the west bank and the east side of Aganotokula (Whale) island.

When past Aganotokula island the river has a northerly direction for about three quarters of a mile, then turns east for about the same distance, after which it is again northerly for about a quarter of a mile to the entrance of Nimbi creek, and here the gun vessels, employed in the Nimbi expedition, 1895, anchored.

Nimbi creek, about $3\frac{1}{2}$ miles in length, connects Brass river with Nimbi flats; it is narrow and winding, from 40 to 50 yards in breadth, and could,

if necessary, be navigated by vessels drawing not more than $8\frac{1}{2}$ or 9 feet so far as a small island about half a mile south-south-west of Sacrifice island, but the turns and small creeks leading off it are numerous.

One Toru, or Ekole creek, entered about a mile northward of Opolubo island, communicates with the Niger at Ekole, but is only available for vessels drawing $4\frac{1}{2}$ feet water.

Tides.—It is high water, full and change, in the entrance to Brass river at 4h. 30m.; springs rise 6 feet, neaps 4 feet.

Tidal streams.—The ebb stream sometimes runs as much as $5\frac{1}{2}$ knots an hour at springs during the rainy season. It generally runs about 4 knots an hour at springs, and the flood tide 3 knots an hour. Both ebb and flood streams set towards Shore spit.

ST. NICHOLAS RIVER is little known and seldom visited; it is situated 9 miles east of Brass river, and separated from it by a slightly elevated wooded land, the coast line of which curves boldly seawards. The eastern bank of St. Nicholas river is terminated by a large rounded point; the western bank is higher, and slopes towards the sea.*

The two entrance points are very distinct, with the mouth of the river open and bearing N.N.W.; but the entrance appears, when seen from the offing, as if closed by distant wooded land. The entrance of the river may be known by a high and conspicuous clump, about three-quarters of a mile east of the East entrance point.

Bar.—On the bar there are depths of from 3 to 6 feet at low water, spring tides, and at 6 miles above the bar St. Nicholas river joins the Brass river.

SANTA BARBARA RIVER.—The coast eastward of St. Nicholas river is low, covered with mangroves, and fringed by a sandy beach. The entrance of Santa Barbara river lies 10 miles eastward of St. Nicholas river; it opens out on a N.N.E. bearing. Its banks are thickly wooded; the western entrance point is perpendicular, and the eastern point forms a slight slope, having a small part broken into steps.

San Bartholomeo bank.—So far as Santa Barbara river a vessel approaching from the westward may run without fear at a distance of 3 miles from the coast, in depths of 4 or 5 fathoms; but at that distance from the land abreast of the river San Bartholomeo, is situated the outer edge of a shoal bank, on which a vessel is likely to be carried rapidly by the flood tide. It is the more necessary to be on the guard against this bank, as the coast line changes its direction rather more to the southward between Santa Barbara and San Bartholomeo rivers.

See chart No. 1,369.

* See chart No. 1,357.

SAN BARTHOLOMEO RIVER.—This stream lies about 7 miles south-eastward of the entrance to Santa Barbara river; the western entrance point has a somewhat square shaped and conspicuous clump of trees on it; the eastern point is bluff. The entrance of the river does not open out until it bears North. Within the river the land, when seen from the offing, appears low, wooded, and detached like an island. Shoal ground extends 4 miles south from the entrance, close outside which the depths are 3 and 4 fathoms.

Both the Santa Barbara and San Bartholomeo rivers are said to communicate with the Niger and Sombrero rivers.

SOMBRERO RIVER lies 10 miles eastward of St. Bartholomeo river; it does not open out until it bears west of N.N.E.; on the western entrance point stands a clump of trees which at one time perhaps resembled a hat, which circumstance possibly gave the name of the river; the eastern entrance point has a round clump of trees on it. Lieutenant N. B. Youel, H.M.S. *Rifleman*, 1886, remarks that "when the entrance bears N.N.W. the river is fully open and both points show as high, bluff and bold points; the clump of trees on west point is most distinct."*

There is a passage over the bar, but rendered dangerous by an extensive shoal off its mouth, on which a heavy sea breaks; this shoal, on the outer part of which there is a depth of 2 fathoms, extends $4\frac{1}{2}$ miles off shore.

The Sombrero river rises in lake Ikutta, and, under the name of the Orashi, flows in a south-westerly direction for about 30 miles past Kriekena, where there is a factory, and a hulk which was brought through Ndoni creek from the river Niger, to the town of Idu. Omoko, the chief town of Ibo district, is situated on the south side of a creek on the left bank of the river, the entrance to the creek being about 7 miles above Idu and 2 above Kriekena.

From Idu, the river which now takes the name of the Engenni, continues in the same direction for about another 20 miles to within 4 or 5 miles of the Niger river in latitude 5° N.,† it then turns to the south-east and is about 100 yards wide for the first 4 miles to Ogolokiamia through open country, and then through dense mangrove bushes and very winding for 16 miles, to its junction with Sombrero river opposite to Degama creek, about 26 miles from the mouth of the Sombrero.

See chart No. 1,357.

* See Admiralty chart:—Bonny, New Calabar, and Sombrero rivers, No. 1,174; scale, $m = 0.65$ inch.

† This portion of the Engenni is about 100 yards in width, with good banks, and the palm oil tree growing everywhere in abundance; the country is thickly populated with an industrious people, and trading canoes were loading with palm oil at every important place. The towns are dirty and squalid. The Calabar chiefs deal at the Engenni markets and sell to traders at Degama and Bugama.—Commander Crofton, H.M.S. *Landrail*, November 1888.

Degama creek, which is on the left bank of the river, though narrow and tortuous, has a least depth of 3 fathoms water through it, this creek connects Sombrero river with Bugama creek, and thus forms a means of inland navigation between the Sombrero, New Calabar, and Bonny rivers.

From August to the end of October the river is at its highest, the estimated rise ranging from 6 feet at the entrance to 25 feet at Kriekena; during this season a small handy vessel of 10 feet draught might ascend from Degama to Ikutta lake. The river begins to fall rapidly after the 1st November.

Factories.—There are factories at Degama, on the north side, and at Abonema on the south side of Degama creek, where it joins the Sombrero; also at Bugama near the junction of Degama and Bugama creeks, and at Bakana, about 6 miles above where Bakana creek joins Cawthorne channel.

Bar.—A heavy surf prevails on the bar, which would apparently often prohibit access; there is a depth of about 11 feet on the bar at low water, spring tides. Sombrero river may be easily known by Fouché point, 7 miles to the eastward of it, on which are some detached lofty trees.

H.M.S. *Alecto* in April 1887, when leaving the river, passed about a cable from West point, and steered for the Inner buoy, which was passed close to, leaving it on the port hand; a straight course S.S.E. $\frac{1}{4}$ E., was then steered for the Outer buoy, passing it close to on the starboard hand; between the buoys the depth ranged from 2 to $2\frac{1}{2}$ fathoms at nearly half flood; the two buoys were then kept in line astern until the water deepened to 5 fathoms.

If the buoys are gone, East point, bearing about N.N.W., will lead through the channel.

BONNY AND NEW CALABAR RIVERS.—These two rivers practically have their source in lake Ikutta. Fouché point forms the western limit of a large bay or estuary, into which the New Calabar and the Bonny (or Obáne) river discharge their waters; its eastern limit is Rough Corner point, bearing E. $\frac{3}{4}$ S., distant $5\frac{3}{4}$ miles from Fouché point, which is low and swampy, the edge of the high and thick bush being 2 cables inside the point.*

From Fouché point, the coast trends in a west-south-west direction for 2 miles to the eastern entrance point of Fouché creek, which is low and sandy; the bush being a third of a mile from high-water mark. The outer edge of the surf extends 3 cables off Fouché point.

Breaker islands, situated between Rough Corner point and Fouché point, about a third of the distance from the former, appear to be

See chart No. 1,174.

* See Admiralty plan:—Bonny and New Calabar rivers, No. 622; scale, $m=1\cdot04$ inch; also plan of Bonny, New Calabar and Sombrero rivers, No. 1,174; scale, $m=0\cdot65$ of an inch.

subject to continual change, they formerly consisted of two low, sandy islands, covered with grass, stunted bush, and a few mangroves, but, in 1896, they were reported to have disappeared; in 1898 they are stated to be again in existence and uncovered at high water, spring tides, with some bushes growing on them.

The sandy spit, representing the islands, is about $2\frac{1}{2}$ miles long in a north and south direction, and the southern extreme curves round to north-eastward, following the line of Bonny river, and leaving a channel between it and Rough Corner point one mile in width. These islands are reported to be reforming in a position more to the westward, but the islands and banks in the vicinity are subject to frequent alteration.

Yellow island, about a mile in length, in a north and south direction, is small, composed of sand and with mangrove trees about 30 feet high in the centre. It stands on the same large sand bank as Breaker islands, but on the extreme western edge, and is situated N.E. by N., distant $1\frac{1}{3}$ miles from Fouché point, and S. $\frac{5}{8}$ W., $1\frac{1}{10}$ miles from Calabar point.

Peter Fortis point, the east extreme of the coast which divides the mouths of New Calabar and Bonny rivers, is situated N.E. $\frac{3}{8}$ N., distant $4\frac{2}{3}$ miles from Rough Corner point; on the extremity of this point are four round trees, resembling haystacks when seen from a distance.

The bottom off Peter Fortis point is covered with long weeds, which are liable to choke the valves of a steam-vessel if the point is rounded too closely. There is a good place on this point to beach small vessels.

Deadman island.—Deadman point, the south extreme of Deadman island, is a round projection covered with mangroves, nearly midway between Peter Fortis and Calabar points, and situated E. $\frac{1}{2}$ S., distant $3\frac{1}{2}$ miles from the latter, with Cawthorne channel (False Calabar) lying between.

Rough Corner point, forming the eastern limit of the estuary, is situated E. $\frac{3}{4}$ S., distant $5\frac{3}{4}$ miles from Fouché point; the bush extends close down to the sandy beach, and the point appears as a bluff when bearing from N.N.E. to N.N.W. Ju-ju point lies about three-quarters of a mile north-east of Rough Corner point.

Sand island.—From Rough Corner point an extensive sand-bank stretches to the S.S.W., on the western edge of which is Sand island, a narrow strip of sand, which is about half a mile long in a north-north-east and south-south-west direction; uncovered at high water, and has some trees and a hut on it. Its northern extreme is situated $1\frac{3}{4}$ miles, S.S.W. $\frac{5}{8}$ W., from Rough Corner point. A continuous line of breakers is seen between Sand island and Rough Corner point even at high water.

Tidal streams.—Near Sand island both ebb and flood streams set towards it.

Rough Corner spit forms the southern edge of the sand bank off Rough Corner point, from which latter it is distant 3 miles in a S.S.W. $\frac{1}{2}$ W. direction; thence the line of shoal water turns to the south-eastward, forming the southern edge of Portuguese bank.

The intermediate space between Rough Corner spit and Rough Corner point is a long line of broken water.

The southern and western sides of Rough Corner spit are "steep-to," and must be approached with caution.

Portuguese bank, an extensive flat, having depths of from 13 to 18 feet on it, over hard sand, is the continuation to the eastward of the shoal off Rough Corner point, and extends 5 miles from the shore; it frequently breaks all over in the rainy season.

Outer Baleur bank, with depths of from 6 to 12 feet on it at low water, is divided from Portuguese bank by a bar, over which are Portuguese and Old Man of War channels.

The bank is $2\frac{1}{4}$ miles in length in a north-west and south-east direction, with an average width of about 2 cables. The shoalest spot, with 6 feet water over it, is on a sand-head, near the centre of the bank, and from it Rough Corner point bears N.N.E. $\frac{1}{3}$ E., distant 6 miles. From this spot a detached shoal, with 10 feet water over it, bears E. $\frac{3}{8}$ N., distant $1\frac{1}{2}$ miles.

The whole bank breaks at half ebb, and in rough weather at all times of tide.

Inner Baleur bank, lying half a mile from the northern extremity of the Outer Baleur bank in a northerly direction, is a narrow ridge of sand, one mile long in a north and south direction, the shoalest part, with 8 feet water over it, being near its southern edge, from which Rough Corner point bears N.N.E. $\frac{7}{8}$ E., distant $4\frac{8}{10}$ miles.

A shoal, with 17 feet water over it, lies N.N.E., distant half a mile from the northern extreme of Inner Baleur bank; from it Rough Corner point bears N.E. $\frac{3}{8}$ N., distant $3\frac{9}{10}$ miles, and Baleur buoy bears West, distant 2 cables.

In bad weather Inner Baleur bank always breaks heavily, and even in fine weather at half ebb, and less water than charted is reported in the channel north of the bank.

Buoy.—A conical buoy, painted red, and surmounted by a staff and globe, is moored in 4 fathoms water, off the north extremity of the Inner Baleur bank; from the buoy Rough Corner point bears N.E. $\frac{1}{3}$ N., distant 4 miles. See Caution; buoyage, page 33.

Middle ground, a bank nearly 2 miles in length in a north-west and south-east direction, with an average width of half a mile, has 13 feet least water on it, and lies one mile westward of Outer Baleur bank.

The shoalest spot of 13 feet is near the centre of bank, and from it Rough Corner point bears N.E. $\frac{5}{8}$ N., distant $6\frac{3}{4}$ miles.

Buoy.—A conical buoy, painted black, and surmounted by a staff and globe, is moored in 19 feet water, off the north-western edge of the Middle ground; from it Rough Corner point bears N.E. $\frac{1}{8}$ N., distant $6\frac{1}{2}$ miles. *See Caution; buoyage, page 33.*

A Patch, with 17 feet water on it, lies about a quarter of a mile to the north-west of the Middle ground, and is reported to have extended for 3 or 4 cables in a north-easterly and south-westerly direction, and about 2 cables in a north-westerly and south-easterly direction.

Western breakers, separating Bonny and Fouché channels, are triangular in shape, and the continuation of the shoals and sand banks running south-west from Breaker island, broken only in one place by the Two Fathoms channel. They always break heavily, even at high water in fine weather.

The southern extreme is situated S.W. $\frac{3}{8}$ W., distant 6 miles from Rough Corner point, and S. by E. $\frac{1}{4}$ E., distant $4\frac{3}{4}$ miles from Fouché point. From thence the line of breakers extends in a north-east direction, for 2 miles, so far as the Two Fathoms channel, and the western edge in the direction of Fouché point for $2\frac{1}{2}$ miles, then turning back south-east for $2\frac{1}{2}$ miles and forming the western side of the Two Fathoms channel, thus enclosing a considerable area of broken water.

On the eastern side of the Two Fathoms channel the eastern edge of the breakers continues to run north-east, whilst the western edge extends in a north-north-west direction towards Yellow island, the whole of the enclosed space being a large flat, which breaks heavily at half-tide, even in fine weather. It must be remembered that the flood tide in Fouché and Bonny channels always set towards the Western breakers.

Fouché patches, a cluster of shoals with 5 and 6 feet water on them, lie within an arc of Fouché point bearing between N.N.E. and N.E. $\frac{1}{2}$ E., from which they are distant from one to $1\frac{3}{4}$ miles.

BONNY RIVER.—From Rough Corner point the coast trends N.E. $\frac{3}{4}$ E. for $3\frac{1}{2}$ miles, to the factories and mission house of Bonny, a large native town. Bonny town stands on ground nowhere more than 4 feet above the river, the soil being composed of sand and decayed vegetation; there are mangrove swamps close to, and during the rainy season the site is more or less covered with water; several hulks lie aground on the beach. A new mission chapel has been built, the old one is now the telegraph station. King Amachri's town is situated 15 miles above Bonny town.

The Consulate, a two-storied building, slate coloured, with a red roof, is situated near the telegraph station; there is a conspicuous chapel with a spire, situated about half a mile south-west of Bonny town.

Okrika town, about one mile up a creek, which has only 6 feet at low water in it, is situated on the right bank, at the distance of 19 miles above Bonny town. Abreast the creek the river is about one mile wide, with depths of from 7 to 10 fathoms on the Okrika side, but a large mud bank which dries, blocks the western half of the channel.

In October 1888, H.M.S. *Bramble*, drawing $12\frac{3}{4}$ feet water, proceeded up the river to the entrance of Okrika creek, and anchored in the centre of the river in 9 fathoms water, to the north of the mud bank. The depths varied from 13 to 6 fathoms, except abreast of Boler creek, where a bar stretches across the river, having a passage near its centre of 17 feet water over it.

Trade is carried on between the Bonny and Opobo through Tullifer creek, which connects the two rivers.

Communication.—The steamers of the British and African Company and the African S.S. Company call monthly at Bonny; there is telegraphic communication with all lines.

Coal and supplies.—Coal, in small quantities, may be obtained from the steamers of the British and African Company, and lighters capable of holding from 3 to 5 tons may be hired from the factories; coaling would probably be at the rate of from 8 to 10 tons per hour. There is now no coal depôt. Fresh provisions are, as a rule, plentiful. Pigeons may be shot in Boler creek in the early morning.

Piers.—Boler's pier, the southern of three, may be recognised by having a white flagstaff at its extremity, and each of two factories, north-east of this, have piers extending from the beach, which are used for loading and unloading canoes and lighters.

Boats, landing at the piers, should not go inside the ends to avoid portions of wrecks.

Submarine telegraph cables.—Two cables are landed at Bonny town, from which they laid parallel to the shore to Rough Corner point, in some places being half a mile distant; vessels are cautioned not to anchor in the vicinity of the cables, the positions of which are shown in the charts.

Position.—A stone, 47 yards southward of Boler's pier, marking the observation spot, is in lat. $4^{\circ} 25' 56''$ N., long. $7^{\circ} 9' 50''$ E.

Pilots.—The duty of piloting is performed generally by the masters of merchant vessels engaged in the palm-oil trade, who are far better acquainted with the navigation, and more trustworthy, than the native

pilots. These latter are stationed on Ju-ju point, and, if it can be heard, the usual signal with a gun will be attended to; or a boat may be sent up the river for one of the masters of the merchant vessels generally lying there.

Bonny channel.—Buoys.—Considerable changes are reported in the portion of the Bonny channel between Western breakers and Inner Baleur banks; and neither the colour, distinguishing topmarks, nor positions of the buoys should be depended on.

There are generally three buoys in this channel.

The outer, known as the Fairway buoy, is a large conical buoy, painted red, and surmounted by a staff and cage, with Rough Corner point bearing N.E., distant $8\frac{1}{3}$ miles, and Fouché point North.

The Middle buoy, conical, painted black, and surmounted by a staff and cage, marks the north-western edge of the Middle ground.

The Inner buoy (Baleur buoy), conical, painted red, and surmounted by a staff and cage, marks the northern extremity of Inner Baleur bank. (*See Caution; buoyage, page 33.*)

A spherical buoy, painted red and surmounted by staff and globe, lies about 2 cables north of Rough Corner point and between the two lines of telegraph cables.

Note.—The hard sandy bottom off this river extends so far as a depth of 6 or 7 fathoms. At this depth off the other rivers in the vicinity, the bottom is invariably of soft mud. In thick weather the Bonny can be recognised by this peculiarity.

Outer anchorage.—At no season of the year should a vessel anchor off the entrance of Bonny river in a less depth than 7 fathoms, and a good berth is with Fouché point bearing North or N. $\frac{1}{2}$ W.; not less than 50 fathoms of cable should be veered.

Inner anchorage.—The anchorage for vessels of war off Bonny town is in 10 fathoms water, over mud, at about half a mile off shore, a little below Boler's pier.

Anchorage off Breaker island will be found an agreeable change to a vessel that has been some time in the river. Here there is generally a fresh sea breeze, and plenty of fish may be caught with the seine.

Note.—Vessels should not anchor at the entrance of Cawthorne channel so as to interfere with vessels using it.

Directions.—Having arrived off the Fairway buoy with the Middle buoy nearly in line with Rough Corner point, steer in for the latter bearing N.E. $\frac{1}{8}$ E., passing between the 17-foot patch and the Middle ground, and to the westward of the Middle buoy, when abreast which Rough Corner point will be seen open northward of Baleur buoy.

Continue on the same course, passing westward of the latter buoy, and then haul up N.E. $\frac{1}{4}$ N. for Peter Fortis point (the trees on it form two distinct clumps and are a good mark), keeping it well open west of Rough Corner point to avoid being set on Sand island; pass about 3 cables from Rough Corner point, keeping about the same distance off the eastern shore up to the shipping, where there is anchorage in 10 fathoms water, over mud, south-west of Boler's pier.

The least water found will be a depth of 19 feet at low water, which is crossed when north-east of the Middle buoy. Vessels do not load to above 21 feet draught.

Old Man of War channel.—Vessels leaving Bonny river may cross the bar in 15 feet at low water by using this channel, the southern entrance to which lies 4 miles eastward of Bonny channel; if under sail they should drop down with the tide and anchor at about $2\frac{3}{4}$ miles south-westward of Rough Corner point, until the next high water, when they may steer about S.S.E., or with Pyramid tree (a remarkable tree $1\frac{1}{2}$ miles north-east of Calabar point) astern, bearing N. by W. $\frac{1}{4}$ W., between Rough Corner spit and Inner Baleur bank, until Rough Corner point bears N. by E. $\frac{1}{8}$ E., which mark, kept on astern, leads over the bar.

In the rainy season it frequently breaks in this channel, but the sea is end on with respect to the vessel.

Portuguese channel.—This channel leads between Portuguese bank to the northward, and Outer Baleur bank to the southward.

Least depth in the channel, 16 feet at low water.

To enter.—Cross the bar with the conspicuous tree on Fouché point open northward of the Baleur buoy, bearing N.W. $\frac{3}{4}$ W. The narrowest and shoalest part of the channel is about 4 miles south-eastward from Baleur buoy, which can be easily seen from that distance, and the conspicuous tree on Fouché point will also be distinguishable on a clear day. When Rough Corner point bears N.N.E., haul up N. by W. $\frac{1}{4}$ W. for Pyramid tree, already mentioned, to round Rough Corner spit into the Bonny channel.

In the rainy season there is a heavy beam sea throughout the whole length of the Portuguese channel, and it not unfrequently breaks all over, but in fine weather it may be used with safety by vessels of 15 feet draught within an hour or two of high water.

CAUTION.—Mariners are warned that no reliance can be placed on the positions or colours of the buoys at the entrance of the Bonny, New Calabar, or any of the oil rivers, as they are frequently either out of position or washed away, especially during the rainy season; but should the buoys

be gone, Rough Corner point, bearing N.E. $\frac{1}{8}$ E., with Peter Fortis point kept well open west of it, will lead over the bar of Bonny channel in the deepest water; or should Rough Corner point be obscured, a vessel must be guided by the western breakers which are always apparent, and should be kept at a distance of about half a mile.

Depths.—Steam-vessels drawing 18 feet should wait for 2 hours' flood to cross the bar, those of 12 feet draught and less can enter at any time of tide.

NEW CALABAR RIVER is entered between Fouché point and Yellow island; its western bank, with a general N. by W. direction for 5 miles from Fouché point, is thickly wooded. The shore is fringed by mangroves in places, and elsewhere thick bush grows close down to the water's edge. Several creeks open into the river on this side, those by Young town and Fouché town being the most considerable.

Calabar point, the southern point of the eastern bank of New Calabar river, is situated N.N.E., distant $2\frac{1}{2}$ miles from Fouché point. From here a line of thick high mangroves extends N.E. by E. for $2\frac{1}{4}$ miles, to the entrance to Cawthorne channel.

The eastern bank extends from Calabar point in a northerly direction, and is lined with mangroves and thick bush. There are two creeks at three-quarters of a mile and $2\frac{1}{4}$ miles above Calabar point respectively, which are said to lead to Cawthorne channel.

Mission houses.—Three white houses are situated on the eastern bank $1\frac{1}{10}$ miles above Calabar point. They can be distinguished on a clear day from a distance of 7 or 8 miles.

Directions.—The direct channels into New Calabar river are seldom used since the opening of Cawthorne channel.

West Fouché channel.—This channel leads between Fouché patches and the land, in 12 feet at low water, but there are no marks, so the eye and lead must be the principal guides.

To enter.—Pass the breakers off the eastern entrance point of Fouché creek, at a distance of about 2 cables, and steer N.E. $\frac{1}{8}$ E. for Fouché point, passing one cable northward of the westernmost of the Fouché patches, after passing which, alter course to E. by N. for the factories at Bonny, rounding the breakers off Fouché point (which are generally clearly seen) at a distance of 2 cables.

The depth in West Fouché channel is 12 feet at low-water.

Fouché channel, leading westward of the Western breakers, is much obstructed by shoals of from 8 to 9 feet water, which break at half ebb in fine weather; the whole channel breaks across in bad weather.

Directions.—The best mark for entering is the river Bluff on east side of New Calabar river, in line with the extreme of the sand off Fouché point, bearing N. $\frac{3}{4}$ E., with the mission houses open eastward of the point; this leads through in 11 feet water. When within $1\frac{1}{4}$ miles of Fouché point, haul up N.E. by N. for the western side of the entrance to Cawthorne channel, passing about a quarter of a mile eastward of the breakers off Fouché point; thence the course is N. by W. $\frac{1}{4}$ W. for 4 miles to abreast of Young town. Tumbo and Young towns should be passed at the distance of one mile, to avoid off-lying banks.

Two Fathoms channel.—This is the only navigable channel over the flats between Bonny and New Calabar rivers, having a depth of 12 feet at low water. The eastern entrance is situated nearly 4 miles S.W. $\frac{1}{2}$ W. from Rough Corner point. The narrow part of the channel is half a mile long, and about 100 yards broad, on the three distinct bars which have to be crossed.

Buoy.—A conical buoy, painted white, and surmounted with staff and cage, is moored in 20 feet water, at the western entrance of the Two Fathoms channel. From it Fouché point bears N.W. $\frac{7}{8}$ N., distant $3\frac{1}{10}$ miles; Rough Corner point E.N.E., and Baleur buoy S.E. $\frac{1}{4}$ S. *See* Caution: buoyage, page 33.

Directions.—From a position $1\frac{1}{2}$ cables north of Baleur buoy, a remarkable black clump of trees, having a sharp fall on the right, and sloping away gradually on the left, known as Mark tree, will be observed just open northward of the Two Fathoms channel buoy, bearing N.W.*

Steer for the buoy on this bearing, which leads over the first bar; on deepening the water after crossing, bring Mark tree in line with the buoy. After crossing the second bar, bring Mark tree open southward of the buoy, which leads over the third bar. The three bars are passed when the large clump of trees near Bonny town opens of Rough Corner point, bearing about N.E. by E. $\frac{1}{2}$ E.

Having crossed the bars, continue the same course, passing close southward of a shoal with a depth of 12 feet on it, situated three-quarters of a mile, N.W., from Two Fathoms channel buoy; when Yellow island closes the east bank of New Calabar river, bearing N. $\frac{1}{4}$ W., haul up N. by W. $\frac{1}{4}$ W. in mid-channel.

Boat channel.—This channel leads between Bonny and New Calabar rivers, across the flats northward of Breaker islands and Yellow island. Pass about half a mile north of Breaker islands, steering for Yellow island, and when within one mile of the latter, and near the line of breakers off its southern extremity, steer for Calabar point.

The most dangerous part of the flats is in this vicinity, and it usually breaks at half ebb.

See chart No. 622.

* *See* view on chart No. 622.

Care is required in using this channel, as a beam sea is experienced the whole way, which sometimes unexpectedly breaks heavily. In bad weather it breaks all over and is quite impracticable.

Cawthorne channel (False Calabar) is entered nearly a mile west of Rough Corner point between the shoals extending east of the southern Breaker island and those from the northern side of Bonny river; from this the channel passes about half a mile west of Deadman island, and east of the island which forms the east side of New Calabar river.

This channel allows vessels to proceed from Bonny to Calabar, Bugama, or Degama at all times, without re-crossing Bonny bar, to enter by Fouché channels, and although the route is somewhat longer, it is becoming the one generally used, as it offers smooth water, is deeper, and can be taken when perhaps the bar cannot be attempted.

The bottom in Cawthorne channel and in the main river is mud and sand, the bank to the northward of the channel is of hard sand, with very irregular soundings. It is not advisable to take it without a pilot.*

Boler creek, $4\frac{1}{2}$ miles above Deadman island on the east bank of Cawthorne creek, and joining the Bonny river about the same distance north of Bonny town, is said to be unnavigable except for launches, the channel being shallow, and obstructed by snags.

Buoys.—A buoy, painted red, is moored inside and on the east side of the entrance of Cawthorne channel; from it Rough Corner point bears S.E. $\frac{1}{4}$ E., distant $1\frac{1}{2}$ miles, and Peter Fortis point N.E. by E. $\frac{1}{4}$ E.

A buoy, painted black, and surmounted by a staff and globe, is moored, with Deadman point bearing N.E. distant half a mile.

A buoy, painted red, is moored with the north extreme of Deadman island, bearing N.E., distant $\frac{1}{10}$ mile.

At the northern entrance of Cawthorne channel a buoy, painted red, is moored on the western side of a detached shoal which lies off the South point; there are channels on either side of the shoal. (*See Caution; buoyage*, p. 33.)

Pier.—A pier has been constructed off the Custom house on the east side of Cawthorne channel, about a mile above Deadman island.

Directions.—**To Bugama by Cawthorne channel.**—The channel is entered nearly a mile west of Rough Corner point, then steer about N. by W. $\frac{1}{2}$ W., with the north point of Deadman island ahead, or a trifle on the starboard bow, the channel lying about half a mile from Deadman island on the east, and a quarter of a mile from the sand bank on the west side.

See chart No. 622.

* This channel was originally examined by Captain Cawthorne of the African S.S. Company, 1884.

When Peter Fortis point comes in line with the point eastward of Deadman island, bearing about E. $\frac{3}{4}$ N., the course should be altered for the middle clump of trees, bearing N.N.W. $\frac{1}{2}$ W., passing the breakers on the port hand, at the distance of about 50 yards, and thence close to the shore near the clump. A mid-channel course may then be taken until near the junction of the channel with New Calabar river, when the north shore should be kept aboard, to avoid a shoal lying northward of the south point of entrance, or a vessel may pass between the shoal, which is "steep-to," and the point, in from 5 to 7 fathoms water, by keeping close to the point at from 15 to 20 yards from it; the width of the channel is uncertain.

After passing the shoal the southern shore should be followed round to the southward, at about a distance of half a cable, until the whole of the first reach of Bugama creek is well open, bearing about N.W., to clear the spit, marked by fishing stakes, extending nearly a mile to the southward of the dividing point between Bakana and Bugana creeks, after passing which, the point north of Calabar town should be steered for, and passing it closely a mid-channel course preserved up the creek.

To Bakana.—The fishing stakes and mud flats, which can be seen, are a fair guide for piloting by. As a general rule, where there are low bushes of a light green colour with a straight bank deep water will be found close to, and high trees with swampy ground should be kept clear of.

Bakana creek and factory are situated about 6 miles above the Cawthorne channel. Off the factory, and nearly in the centre of the channel, there is a bank with one foot water over it, and two-thirds of a mile further north, and in the centre of the channel, there is a bank having over it a depth of 13 feet. Bakana factory, on the east bank, is situated 9 miles above the entrance to Cawthorne channel. A pilot should be taken and the lead constantly hove.

Least depth is 3 fathoms.

To Degama, by Cawthorne, Haynes, Billee, and Kra Kra creeks.—The directions for Bugama, *viâ* Cawthorne channel, will be followed until in Bugama creek.

Haynes creek is 2 miles within the entrance, on the south bank, and its south entrance point may be rounded closely and mid-channel kept until an island lying off the western entrance of Haynes creek is seen. A large shoal extends south and south-west of this island, but being marked by fishing stakes its extent can be judged; the channel is south and west of this island, and thence north into Billee creek, which may be navigated by keeping in the bends and avoiding the points.

See charts Nos. 622, 1,174.

The same directions apply to Kra Kra creek (which is really the western portion of Billee creek) except when leaving Kra Kra creek, in Sombrero river, a large shoal fronts the creek. This may be passed on either side, but the channel east of it is recommended as being less affected by the tidal streams. The north point of Kra Kra creek should be rounded as closely as possible, and the east bank kept on board at about half a ship's length until nearing Palm village.

A shoal extends for some distance south and south-east of Lilly point, and here the west bank of the creek must be closed; after passing Lilly point the channel lies quite close to the east bank, as the shoals off the opposite bank are irregular and extensive.

Supplies.—Degama has a considerable trade; bullocks may be obtained. The Vice-Consulate is on board a hulk.

Anchorage.—The best anchorage is south-south-west of the hulks and just north of Abo creek.

Tides.—It is high water, full and change, at Bonny town at 4h. 50m.; springs rise 6 feet, neaps 4 feet.

Tidal streams.—The ebb stream sets over Baleur bank, the flood stream sometimes sets over the western shoals, but if the outside current is setting strongly to the eastward, the flood stream will be but little felt. Near Sand island both ebb and flood streams set towards that island.

Off Bonny town the ebb stream runs from 3 to $3\frac{1}{2}$ knots an hour in a S.W. by W. direction.*

COAST.—From Rough Corner point the coast trends S. by E. one mile, then turns E. by S. $\frac{1}{2}$ S. for 4 miles, after which its general direction is E. $\frac{1}{4}$ S. for 23 miles to Opobo river; it is low, swampy, and covered with mangroves, palms, oaks, and such trees as grow in brackish water. Fertile land, more elevated above the sea, lies several miles inland.†

When running along the coast between Bonny and Opobo rivers, vessels should keep outside the depth of 8 fathoms.

Antonio river.—Eastward of Rough Corner point, distant 13 miles, is situated Antonio river, or by corruption the Andoni; the entrance is obstructed by sand banks, which permit a passage for boats only. H.M.S. *Barracouta* anchored off this river in March 1826, with the entrance, which is between bluff points and well defined, bearing N. by E., distant $2\frac{1}{2}$ miles, and that vessel's pinnacle crossed the bar. There is a solitary tree on the western entrance point, and the entrance closes on a N.N.E. $\frac{3}{4}$ E. bearing.

See chart No. 1,174.

* Remark book, Navigating Officer H.M.S. *Widgeon*, 1890.

† See chart No. 1,357.

OPOBO RIVER, lying 14 miles east of Antonio river, is difficult to distinguish until the mouth of the river is open and Foster clump made out, when the white factories, with galvanised iron roofs, situated on the east bank, $1\frac{1}{4}$ miles within East point, are seen; they are visible in clear weather from a distance of 6 or 7 miles.*

The Opobo receives on its left bank several narrow but deep and navigable affluents. At 40 or 50 miles, in a straight line from the coast, it flows not far to the westward of the large and populous town of Benda, which is a great trading centre for slaves and ivory.

The Opobo leads into the heart of the Opobo country, which is densely populated. The people are cannibals, but not of a ferocious type; their towns are not crowded, but have open spaces in them which are kept very clean. In the vicinity, there are dense groves of oil palm, and thriving plantations of maize, yams, beans, and colocasia arums.

At about 12 miles from the mouth of the Opobo, Ogoni creek branches off to the westward; it was traversed in a steam cutter for about 10 miles, for which distance it is a fine, deep stream, running between high banks, with the oil palm growing in abundance; the natives, however, do not extract the oil, but confine their labours to agriculture and fishing. Probably this river is connected with Antonio and Bonny rivers, and may prove of great importance in developing the inland navigation of the country, as trading steamers are hampered by the Opobo bar, which could thus be avoided.

On September 27th, 1889, H.M.S. *Alecto*, drawing 8 feet 3 inches, proceeded up the Opobo river for about 19 miles, as far as the commencement of the flats, having rather shoal water at half tide after passing the first island. The next day the flats were crossed at high water, spring tides, the least water being 9 feet, this being the only time of tide at which they appeared to be passable in a vessel of the *Alecto*'s draught, and it is not certain whether she could cross at high water neaps or in the dry season without being lightened. There are several deep holes on the flats where a vessel could lie at anchor at low water. When crossing the flats the left bank of the river should be hugged closely.

Azuminé creek, on the left bank of the river, and about 25 miles from the mouth, is narrow, but deep, with a strong current, and much encumbered by snags. At about one mile above Azuminé creek, or 4 miles above the flats, the river widens, having a shoal of about half a mile in extent in it, and as the tide was not at its highest, H.M.S. *Alecto* found little water to spare over it; the river is tidal so far as this. Above this shoal for about 6 miles to Ohombela creek the river presented no difficulties; in the wet season, however, owing to the strength of the current, the river should not be ascended beyond this creek.

See chart No. 1,357.

* See Admiralty plan:—Opobo river, No. 628; scale, $m = 2\cdot0$ inches.

From Ohombela creek to Akwita creek the river is narrow and full of sharp turns, rendering it difficult to keep clear of the bushes on the banks, which are "steep-to." Akwita, where Miller's factory is established, is a short distance from the river, being reached, like nearly all the other towns, by a creek. The town, which is hidden from the river by jungle, is a considerable place, consisting of a collection of villages, amidst high trees and plantations.

At about 2 miles above Akwita creek there is a small but convenient creek, named Asa, where a factory will probably soon be established; Obajo, a small village which is up this creek, was visited in the *Alecto's* steam cutter. A market is held here by Bonny men, who, at present, monopolise the trade; the produce goes down the river and through Tullifer creek to Bonny. The town of Asa, which is a short distance higher up the creek, is about 5 miles overland from Akwita; it is reported to be rather an important place.

The river above Akwita creek is very rapid at this time of year; it is described as being deep and clear of shoals, but encumbered with snags, and the bends in it are so sharp that it is only fit for a large steam launch to navigate. The banks of the river to a short distance beyond Akwita creek consist of a fringe of impenetrable marshy jungle, with many creeks; above this, and as far as the Opobo has been explored, the jungle is succeeded by open country.

Positions.—Latitude of the factory at Akwita, $4^{\circ} 58' N.$; longitude, $7^{\circ} 18' 40'' E.$

Latitude of West point at entrance of river, $4^{\circ} 27' 22'' N.$; longitude, $7^{\circ} 33' 56'' E.$

Opobo, a not very large, but packed and squalid town, built by King Ja-Ja in about 1870, is situated on the right bank, and distant about $4\frac{1}{2}$ miles above the factories, which, from its position with respect to Tullifer creek, leading to the Bonny river, entirely commands the approach to that river.* There is a considerable trade on the river.

Factories.—Five factories are situated on the east bank of the river abreast Sandy point, the southern being the British Vice-Consulate; Messrs. Miller's factory is on the opposite side.

European establishments have been placed, during 1888, at Esene, Obako, Ohombela, and Akwita, all of which places are connected by water with the Opobo.

See charts Nos. 628, 1,357.

* The Opobos have about 70 war canoes, some of them well armed. The canoe *Victoria* has two gatlings and one 6-pr. B.L.R.; also a gatling for another canoe; a great number of the men have breech-loading rifles.—Commander R. W. Craigie, H.M.S. *Flirt*, 1884.

Communication.—The steamers of the British and African Company and African SS. Company call every month at Opobo. Branch steamers run weekly between Opobo and Bonny rivers, and may be expected a day or two after the arrival of the English mail steamer at Bonny.

Pilots.—The best pilots are the masters and mates of the branch steam-vessels; sailing vessels loose the fore top-gallant sail as a signal.

West point forms the western entrance point of the river, from which the coast trends N.E. by N. for a distance of $2\frac{1}{4}$ miles to Sandy point, on which stands Sierra Leone town, chiefly composed of native huts with one or two white oil sheds. From Sandy point the line of the river turns abruptly N.W., with an average width of three-quarters of a mile, both shores being lined with impenetrable mangroves.

Beacon.—A beacon is sometimes standing on West point, but in 1897 it was not in existence.

East point, forming a tolerably sharp elbow, is situated E.N.E., distant $1\frac{1}{2}$ miles from West point. From East point the river bank trends N.N.E. for one mile to the factories opposite Sandy point, where the stream is half a mile broad. From the factories the river bank curves round to the north-westward, which direction is continued as far as Opobo town.

Bar.—The bar of Opobo river is very shoal, said to frequently shift its position, and breaks all over in bad weather, when it is recommended not to attempt to cross, but it is generally easy and safe of access at other times.

From West point shallow water extends southward for nearly 2 miles, and then gradually curving round to the eastward, meets the shoals running southward from Eastern spit, thus forming the bar. The bottom is of sand everywhere on the bar, changing to mud on either side.

The shoalest part is on a large patch one-third of a mile long by about $1\frac{1}{2}$ cables broad, with from 4 to 5 feet on it at low water, and situated S.W. by S., distant $1\frac{1}{2}$ miles from West point.

Another smaller patch, with 4 feet water over it, lies a quarter of a mile, S.E. by E., from the larger patch, and a small sandhead with depth of 6 feet is situated one-third of a mile S. by E. from the latter. Patches of 6 feet at low water extend south-west from West point for $8\frac{1}{2}$ cables. These patches break at half ebb even in the finest weather.

To the westward of the Direct channel the general depth on the bar is 7 feet at low water, and the same for a distance of half a mile to the eastward of this channel, but further to the eastward the depths

See chart No. 628.

gradually increase, reaching the maximum of 10 feet on the leading mark for the East channel, and decreasing to 8 and 9 feet when yet more to the eastward.

Depths.—H.M.S. *Alecto*, in June 1893, found 14 feet at half tide, and in November 1893, at high water, spring tides, found 21 feet least water on the bar.

H.M.S. *Alecto*, 1897, crossed the bar with 15 feet least water in September.

Eastern spit.—This spit extends in a south-west direction from East point for $1\frac{1}{2}$ miles, leaving a deep channel between its western edge and the west bank of the river, one-third of a mile broad.

It is nearly dry at low water, spring tides, and always breaks very heavily on the outer edge. The western and north-western edges are "steep-to," but it shelves very gradually on the south and south-east sides, with heavy rollers for a considerable distance even in smooth weather.

Sailing vessels, if rounding Eastern spit too closely, are liable to be swept on to it during the flood tide, and an anchor will not readily hold when among these rollers.

Buoys are sometimes placed to mark the channels over the bar, but in 1897 there were none. See Caution; buoyage, page 33.

Outer anchorage.—The usual anchorage outside the bar is in from $5\frac{1}{2}$ to 6 fathoms water, about 4 miles S.S.W. from West point, from which anchorage the factories will be clearly seen. The prevailing current being to the eastward, vessels nearly always lie broadside to the swell.

Inner anchorage.—Vessels should anchor in from 7 to 8 fathoms water, over stiff mud, off the factories. Mooring buoys are laid down off the different wharves for the convenience of vessels belonging to the traders and are also allowed to be used by vessels of war.

Directions.—Direct channel.—Make the river and houses on the east side of it from the offing before standing in, then cross the bar with the end of the pier (close south of Sandy point) in line with Foster clump, bearing N.N.E. $\frac{1}{2}$ E., which mark leads about a cable west of the eastern spit, after passing which the course is in mid-channel to the anchorage off the factories. As the pier is difficult to distinguish, a better mark is said to be Foster clump just open of the easternmost house on the west side of the river, bearing N.N.E. This channel has shifted to the westward, and it is not advisable for a stranger to enter without a pilot; the sea is end on to a vessel when in the channel.

Eastern channel.—Miller's factory (on western bank of the river) bearing N. $\frac{3}{4}$ E. leads through in 10 feet at low water, spring tides; when

West point bears N.N.W. $\frac{1}{2}$ W., steer for it until the pier comes in line with Foster clump, N.N.E. $\frac{1}{4}$ E., when proceed as before. In 1893 this channel was closed by three wrecks, and it is reported that it is never used.

The Eastern channel is much wider than the Direct channel, but it has the disadvantage of a beam sea; the bar is a mile wide, and this channel, when buoyed, is recommended for strangers in preference to the Direct channel. The best time for entering is at the last quarter of the flood.

H.M.S. *Bramble* (1888) proceeded up the river to Opobo, King Ja-Ja's town, and by keeping a little on the starboard side of mid-channel the least depth was $3\frac{3}{4}$ fathoms. Off the town the depths are from 4 to 7 fathoms.

CAUTION.—Great care should be taken at all times when standing in for Antonio and Opobo rivers, as shoal ground extends several miles off shore between them, and the flood tide often draws a vessel in at the rate of 2 miles an hour; all danger may, however, be avoided by paying attention to the lead, and not shoaling the water under 7 fathoms.

Tides.—It is high water, full and change, in Opobo river at about 4h. 30m.; springs rise 7 feet, neaps $5\frac{1}{2}$ feet. The tidal stream sets fairly into the channel over the bar. At the flats it is high water, full and change at 5h. 15m.; springs rise (approximately) 6 feet; neaps, 5 feet 3 inches.

FALSE KWOIBO RIVER.—At 5 miles to the eastward of Opobo river is the entrance to False Kwoibo river, where there is apparently a boat channel across the bar, but breakers extend for at least 2 miles off shore. Boats can pass to Opobo river through creeks, which abound with sea birds. Near the mouth, hippopotami are numerous, and on the strip of bush at the west side of the entrance, deer, monkeys, and pigeons are plentiful.*

Kwoibo river, the mouth of which is situated 23 miles eastward of Opobo river, is entered between a bluff point on the west, and a low point which bears E.N.E. from it distant 5 cables.

An umbrella-shaped tree is situated on the shore about half a mile west of the west entrance point, and at 3 miles west of it there is a group of three trees.

Factories.—There are three establishments on the Kwoibo, belonging to the Liverpool African Company.

Depth on bar.—From both entrance points shoals extend about a mile to the southward, between which there is a channel with a depth of 6 feet in it at low water.

The best channel across this bar is found by steering for the bluff point when bearing N.W. by N. When across the bar the depth increases

See chart No. 628.

* See chart No. 1,357.

to 2 fathoms, which is maintained up to the anchorage off the factory, situated $3\frac{1}{2}$ miles within the entrance.

Tides.—Spring tides rise 6 feet.

Coast.—From Kwoibo river the coast, retaining the same general features, trends E. $\frac{1}{2}$ S. for about 23 miles to Tom Shot point, on the west side of the entrance, to Old Calabar river.

OLD CALABAR RIVER (known as the Kalaba and Oidne by the natives) has its entrance between Tom Shot point on the west, and Bakasi head on the east, the latter bearing S.E. $\frac{3}{4}$ E., distant 12 miles from the former.*

There are some large and important towns and settlements on the upper Old Calabar, and a considerable trade in palm oil and ebony is carried on in the river, the principal trading post being at Duke town. Old Calabar contributes a larger share of the trade than any of the settlements on the Oil rivers.

Duke town, on the eastern side of the river, 5 miles north-east of Alligator island, and 27 miles within the entrance, is situated between two high hills; here large vessels frequently lie for many months. There are several large factories, a large native town, also a few good houses belonging to the principal chiefs, and a large piece of ground is laid out as a botanical garden in which cocoa, coffee, tea, and pine-apples thrive. The town will not be seen until almost abreast of it. Henshaw town stands on the top of the hill just below the first factory.

There is a British Commissioner and Consul General at Old Calabar, which is also the head-quarters of the Niger Coast Protectorate; the consular buildings, public offices, &c., are built about 200 feet above the river.

The British Consulate and the officers mess stand on a hill at the north end of the town; the latter building is a large house with a red roof and a flagstaff, and again north of this is Queen's beach, the Niger Protectorate dockyard, which consists of a row of red roofed houses with a white flagstaff.

The eastern side of Old Calabar river is intersected by numerous creeks and small rivers, fronted by mud flats which nearly dry at low water.†

Communication.—The steamers of the British and African Company and African S.S. Company call alternately every fortnight; there is also communication with Bonny by a regular system of canoe mails.

* See Admiralty plan:—Old Calabar river, No. 149; scale, $m = 0\cdot5$ of an inch.

† A small steamer proceeded up the river past Old town and Creek town, and thence through a creek running parallel to Cross river, carrying from 5 to 8 fathoms water, until entering Cross river at Farms, and then up Cross river to Jericoek, about 30 miles from Duke town. The flood tide does not run up much above Creek town. The country is hard and dry, with plantations of yams and bananas. Alligators and Hippopotami are numerous.—Lieutenant G. W. Dawes, H.M.S. *Bramble*, September, 1888.

Coal and supplies.—A small quantity of coal, up to 30 tons, can nearly always be obtained; fresh meat, vegetables, and bread are plentiful. The water at Duke town is fresh, but not fit for use; there is a small watering place at Old town.

Repairs.—Small repairs might be executed at a machine shop.

Tom Shot point, the west entrance point, is long, low, sandy, and covered with bushes; between it and West point, 3 miles west of it, there is a large opening which is the outlet of two creeks. At $3\frac{1}{2}$ miles north-north-east of Tom Shot point is the entrance to a creek, on the south bank of which is James town, which may be known by a white house and a red cliff about half a mile south-east of it.

Bank.—From Tom Shot point, an extensive bank extends to the southward, its southern extreme bearing S. $\frac{1}{2}$ W., distant 8 miles from the point; thence the eastern edge of this bank has a north-north-east direction for 7 miles, and for the first 3 miles of this distance, there is a narrow reef, about half a mile in width, which always breaks.

Between the northern portion of this bank, known as Channel breakers, and the land, there is a narrow channel, about a third of a mile in width, which lies that distance off West point and half a mile south of Tom Shot point. This channel, which is used by small coasting steamers, has general depths of from $3\frac{1}{4}$ to 6 fathoms, except at its eastern end, where there is a small bar on which the depth is about 12 feet.

Buoys.—The channel is marked by buoys, painted white on the starboard, and black on the port, hand, entering from the westward. *See Caution; buoyage, page 33.*

Parrot island, covered with high mangrove trees, is situated on the west side of the channel, about 12 miles north of Tom Shot point; it is of a round form and about $1\frac{1}{2}$ miles in diameter.

Tobacco head, $3\frac{3}{4}$ miles north of Parrot island, is difficult to distinguish; until past Parrot island the high trees on Tobacco and Alligator islands appear as an unbroken line.

Alligator island, on which are some remarkable round trees, covers at high water; it is situated on the west side of the channel, 5 miles north of Parrot island. When south-east of Parrot island care must be taken not to mistake this island for Tobacco head.

Creek town.—Old Calabar river is reported to be navigable for vessels with not less than $2\frac{1}{2}$ fathoms water, for 15 miles higher up, but they seldom ascend above Duke town, 2 miles north of which, on the same

See chart No. 149.

bank, is situated Old town, also standing on [tolerably high and well-wooded ground. At 2 miles above Old town, a creek on the western side of the river leads to Creek town. At 20 miles above Duke town the width of the river is only 20 or 30 yards, and the depth about 6 feet.

Bakasi head is the east entrance point, and immediately east of it is situated Bakasi gap, which is very conspicuous, and will first attract attention from seaward when making the land to the eastward of the river. The opening is about one-third of a mile in width, and is the entrance of a creek which communicates with Bakasi river.

An extensive bank, with depths of from $1\frac{1}{4}$ to $2\frac{3}{4}$ fathoms over it, extends $6\frac{1}{2}$ miles south-west and about 5 miles west of Bakasi head; fishing stakes are placed out to the edge of the bank.

James island, separated from the mainland by a deep creek, forms the eastern side of the channel, and is situated $1\frac{1}{4}$ miles north of Parrot island.

Seven-fathoms point, on the eastern side of the river, opposite Alligator island, may be recognised from its being covered with high, straight mangrove trees; rocks are reported to exist north of this point.

Banks.—In the navigable channel between Tom Shot and Seven-fathoms points, three flats extend across the river.

The first, which appears to have a least depth of 3 fathoms, lies in a west-south-west direction from Little Akwa river.

The second, extending west from the entrance to Great Akwa river, has $2\frac{1}{4}$ fathoms water over it; and James flats, the third, with a depth of 3 fathoms in the channel, crosses from the north point of James island to Tobacco island.

From half a mile N. by E. of Seven-fathoms point a bank nearly 4 miles in length, and reported to be extending at its north-east end, past Monkey creek to nearly abreast the consulate, occupies the mid-channel of the river to about half a mile south-west of Duke town. This bank, with 3 feet water near its south-west extreme, has for $1\frac{1}{2}$ miles from its commencement above Seven-fathoms point, channels on both sides of the river, but at 2 miles from that point it joins, for $1\frac{1}{2}$ miles, with the eastern bank of the river, and has again channels on both sides for the remaining portion of its distance to the north-eastward.

Buoys.—Neither colours, distinguishing topmarks nor positions of the buoys marking the channel, can be depended on; in 1899 the buoys were as follows:—

The fairway buoy, conical, painted black, surmounted by a staff and globe, and moored with Tom Shot point bearing N. $\frac{7}{8}$ W., distant about 13 miles.

No. 1 buoy, conical, painted black, moored in about 4 fathoms water, with Tom Shot point bearing W. $\frac{1}{8}$ N., distant about $3\frac{1}{2}$ miles.

Qua buoy, mooring, painted red, and surmounted by a black staff and globe, is moored in about $3\frac{1}{2}$ fathoms water, on the port side of the channel, with Green patch point bearing N. $\frac{1}{2}$ E., and Tom Shot point S. W. $\frac{5}{8}$ W. *See* Caution ; buoyage, page 33.

Anchorage.—Moorings have been laid down off the Government wharf for the Niger Protectorate yacht, inshore of which there are other moorings for lighters, &c. The best anchorage for vessels of war is when just past the yacht's moorings.

Directions.—In the rainy season all the rivers are often obscured by thick weather from seaward, even when in only 5 fathoms water.

The fairway channel, between the banks extending south from Tom Shot point, and west from Bakasi head is $3\frac{1}{2}$ miles wide, and maintains that breadth for about 9 miles in a N.N.E. direction, beyond which it becomes much narrower, and trends towards the eastern side of the river, between the banks which extend from each side. Above Parrot island the channel has so much changed that the Admiralty plan is quite unreliable as a guide to Duke town. There is, however, plenty of water for a vessel drawing 17 or 18 feet, but the services of a pilot are necessary.

Approach from westward.—In approaching Old Calabar river from the westward great care must be taken to avoid the extensive shoals which lie south and south-west of Tom Shot point. Should a vessel, which is not sure of her position, find hard bottom, it would be prudent to haul to the S.E. and make the land about Bakasi gap, where a bearing of East head, if it can be seen, will assist the vessel in ascertaining her true position ; the weather is generally so hazy that the mountain peaks cannot be seen except after a tornado, but, if visible, mount Hewitt, which appears as a perfect sugar loaf on some bearings, is a good guide.

On making Bakasi gap from the westward, do not bring it to bear east of E.N.E., which will lead south of the shoals before mentioned ; with the gap on that bearing, in a depth of $3\frac{1}{2}$ or 4 fathoms, the vessel will be in the fairway for entering the river. If at this point a tornado should threaten, it is advisable to anchor until it blows over ; they usually come from the south-eastward.

From Bonny river to Old Calabar river.—When well clear of Bonny bar steer E. by S. $\frac{1}{2}$ S. for 48 miles, until the trees along the shore have nearly disappeared below the horizon, or until the depth of 15 or 16 fathoms is reached ; then steer East, when the water will gradually shoal from 15 to 12, 10, and 8 fathoms over a mixed bottom of black sand and mud. As Old Calabar river is approached, the bottom becomes hard

See charts Nos. 149, 1,337.

and composed of bright sand, until east of the shoal extending south from Tom Shot point, when it will be muddy.

CAUTION.—Care must be taken not to approach Tom Shot point, or the western shore of the river entrance, nearer than just to sight the trees upon it from a height of 24 or 26 feet above the sea, and should the water shoal to $6\frac{1}{2}$ fathoms on hard ground, stand out until it deepens to 8 fathoms. By no means come into a less depth than $6\frac{1}{2}$ fathoms over any description of bottom whatever, until East head bears N.E. or Bakasi gap N.E. $\frac{1}{2}$ E.; the vessel may then stand towards East head into 5 fathoms water over muddy bottom, when, if necessary, anchor, and send up the river for a pilot.

Attention to the above remarks will take a vessel clear of the breakers at the western side of the approach to Old Calabar river.

From the eastward.—Great care, with attention to the lead, is required to avoid the shoal with less than 18 feet on it at low water, which extends for $6\frac{1}{2}$ miles south-west of Bakasi head.

Depths.—The best time for going up to Duke town is to enter the river about 3 hours before high water at Duke town, when 4 fathoms should be carried as far as Monkey creek. At low water, spring tides, there is not more than 2 fathoms when crossing over to Duke town anchorage.

To enter.—Vessels having made sure of their position off the entrance by bearings, or by sighting the Fairway buoy, should steer in N. by E. $\frac{1}{4}$ E., passing 2 miles eastward of the breaking reef, situated 8 miles south of Tom Shot point and 2 miles west of the position of the Fairway buoy (1898), taking care to guard against tidal influences, as the streams have been known to set both north-east and south-west across the breakers, remembering also that, as a rule, should the water shoal with hard bottom the vessel is too far to the westward; if with muddy bottom, too far to the eastward.

A N. by E. $\frac{1}{4}$ E. course should lead close to the black buoy which lies about $3\frac{1}{2}$ miles east of Tom Shot point, and the course should then be altered to N.N.E. for 5 miles for the Qua buoy. The bright green patch just westward of Akwa point in clear weather is a good guide when steering for the Qua buoy, and will assist in checking the course against the action of the tidal stream, which here, if ebbing, sets out of the Akwayafe and Little Akwa rivers towards the western banks.

After passing the Qua buoy the course is N. by W. $\frac{1}{2}$ W., observing, when on this course, that if the water is found to be shoaling the vessel is probably too much on the eastern side of the channel.

When Tobacco head just opens east of Parrot island, bearing about N.N.W. $\frac{1}{2}$ W., steer to pass close along the east side of Parrot island, watching the tidal stream, which, if ebbing, sets strongly to the south-west, and when the north point of Parrot island is abeam, steer about N. $\frac{3}{4}$ W. to pass close west of James island.

The extremes of James and Parrot islands, just open, bearing about S. by E., lead over James flats, and after they are crossed the channel lies close to the east bank of the river and round Seven-fathoms point, from which this bank is still hugged for a distance of about 2 miles until abreast of a clearing of the bush (generally distinguished by a whitewashed tree, or a strip of coloured bunting, &c.). From this clearing the course is about N. by E. for another clearing on the opposite bank, with a tree, painted in red and white bands, or other distinguishing marks; this leads across in the deepest channel over the bank, already mentioned, which lies in mid-channel.

The right or western bank may then be kept on board until abreast of Monkey creek (generally distinguished by a whitewashed tree), when an E. $\frac{1}{2}$ N. course for the buildings at Queen's beach leads to the anchorage; but on this crossing the water is reported to have shoaled to 2 fathoms. Monkey creek is very small, and it is not safe to run past it.

There is a Swedish factory about half a mile north-east of Monkey creek, which has a pier extending about 200 yards into the river.

In thick weather, when off Akwa point, should the water shoal with hard or sandy bottom, haul more to the eastward; if with soft or muddy bottom, more to the westward.

Vessels from Seven-fathoms point may stand over for Cross river, and, keeping on the western shore, pass westward of the shoal in mid-channel, until just past Monkey creek, or a little above the hulk moored in the river, then cross over and anchor in 4 to 7 fathoms water off the Consulate. This channel does not appear to be now generally used.

Where Cross river joins the main stream there is a shoal of mud with 10 or 11 feet water on it, extending from the north entrance point, towards which the ebb stream out of Cross river inclines to set a vessel if not under command.

AKWAYAFE RIVER.—This river falls into the Old Calabar about 9 miles from the entrance of the latter. In February 1890 H.M.S. *Peacock* (drawing 13 feet) entered on the first of the flood and obtained 15 feet on the bar, increasing gradually to $3\frac{1}{2}$ fathoms so far as the anchorage, 8 miles above the bar.*

This is a very unhealthy river at all seasons of the year.

CROSS RIVER.—The main stream of the Old Calabar, which a vessel ascending to Duke town leaves at Seven-fathoms point, continues above Tobacco head to the north-west under the name of Cross river. Mr. Beecroft in 1842 ascended this river for a considerable distance.

The lower reach of this river, above its junction with the Old Calabar river at Alligator island, was found to have only depths of from 1 to 2 fathoms in it at low water (November), the banks being low and level, but in September 1842, by passing into Cross river through the creek situated immediately south of Fish town, depths of from 4 to 7 fathoms were maintained, and deep water was found nearly as far as Ethiopie rapids, a distance of 200 miles from the sea, the river being generally from 200 to 300 yards in breadth. At Ethiopie rapids the progress of the small steam-vessel in which these discoveries were made was stopped by the rapidity of the downward current, but smooth water was found to extend for some distance above this point.*

The banks of the river above Omun (Umon) are well populated, the land is well cultivated, and large towns are numerous between Itu and Isabang.† The natives of Akuna Kuna country are reported to be cannibals.

In October 1889, H.M.S. *Alecto*, drawing $8\frac{1}{4}$ feet water, and having engaged a native pilot, proceeded from Duke town down to Alligator island, keeping the right-hand bank aboard all the way, thus avoiding the numerous sharp turns in Creek town creek, thence through Ikinetu creek (keeping close to the left bank) to Ikorofiong (Jericoek) and for about 40 miles farther up Cross river to Akuna-Kuna (Ekpesim), with not less than $2\frac{3}{4}$ fathoms of water, the river being a fine stream; the current was extremely rapid, averaging 5 knots, the only danger being from snags. The tide is felt as far as the mouth of Ikinetu creek.‡

The stern-wheel steamer *Beecroft*, 100 feet long, 20 feet beam, and drawing 3 feet water, left Old Calabar on 30th October 1893, to proceed up Cross river. She succeeded in passing the rapids, and anchored for the night some three miles above them. The natives reported that the vessel could proceed for another two days, when the falls would be reached.

The river, however, commenced to fall, and fell 9 feet in 24 hours, obliging the return journey to be at once begun.

Depths.—The Cross river varies considerably in depth according to the season of the year; it is navigable at all times for vessels drawing $3\frac{1}{2}$ feet water as far as Ethiopie rapids, the present limit of exploration. The river is highest in September, and during the rains, from the end of June

* See chart No. 149.

* Journal of Royal Geographical Society, 1844.

† Report on the Niger Delta, by Vice-Consul H. H. Johnston, February 1889.

‡ Lieutenant and Commander H. B. Roper, and Sub-Lieutenant H. O. Boger.

to the beginning of November, rises nearly 20 feet above the dry season limit. Thus, with a little care, such as procuring native pilots, it is navigable for double screw steam-vessels of considerable draught and burden.

Leaving Old Calabar river under sail.—When descending the river from Duke town, the same track should be pursued as that previously described, as nearly as circumstances will permit; if the wind be contrary, which it generally is, the ebb stream is strong enough for backing and filling where the channel is narrow.

CAUTION.—At the bar the tidal stream does not run more than a mile an hour during the dry season, the flood generally setting towards Tom Shot point, and over the shoals to the westward. Particular attention must be paid to the tidal stream when beating out with the ebb, or at any time with light winds.

Tides.—It is high water, full and change, in Old Calabar river (Akwayafe river entrance) at 6h. 30m., springs rise 10 feet, neaps 6 feet (approximate).

At the waterfall in Akwayafe river at 7h. 55m., springs rise 6 feet, neaps 4 feet.

At Duke town, at 5h., springs rise $6\frac{1}{2}$ feet, neaps 5 feet.*

Tidal stream.—The general velocity of the tidal stream is from $2\frac{1}{2}$ to 3 knots an hour at half tide.

DIRECTIONS.—Bakasi gap to Rio del Rey.—After clearing Old Calabar river and having passed Bakasi gap, an E.S.E. course for 10 miles along the southern edge of the bank, extending 7 or 8 miles south-west of the peninsula of Bakasi, brings a vessel to the western entrance of an extensive, open, shallow bay 13 miles wide, into which several small streams fall, the western and largest of which, known as Rio del Rey, is from 3 to $4\frac{1}{2}$ miles wide at the entrance, but rapidly decreases into a narrow channel.†

The coast of the bay on the eastern side slopes from the lofty Cameroon mountains, and on the western side it is formed by the south-east extreme of Bakasi peninsula. The shores are thickly peopled, the inhabitants appearing to be principally employed in fishing.

Rio del Rey.—In October 1885 the Imperial German corvette *Habicht* anchored off the Rio del Rey in $3\frac{1}{4}$ fathoms water, over mud, with

See chart No. 149.

* In April 1888 the river was very full. At springs, the tide remained stationary for an hour before and after high water, and then fell rapidly for 2 hours; remaining stationary again for an hour before and after low water.—Lieutenant G. W. W. Dawes, H.M.S. *Bramble*.

† See chart No. 1,357.

Mount Cameroon bearing S.E. by E., and the peak of Fernando Po, S. by W., afterwards proceeding into the river and anchoring in 6 fathoms water, about 16 miles from the mouth. Here the river divided into two equally wide streams, one northward, said by the natives to lead to Calabar, and the other north-eastward.

Buoys.—A fairway buoy, conical framework, painted red, and surmounted by a ball, is moored in a position S. $\frac{1}{4}$ W., 12 miles from the west point of the entrance of the river.

A buoy, painted red with triangular topmark in a position S.S.E. $\frac{1}{4}$ E., $3\frac{1}{4}$ miles the same point.*

A buoy, painted red, surmounted by a pole and quadrangular topmark, off point Erong, in lat. $4^{\circ} 34' N.$, long. $8^{\circ} 44\frac{1}{2}' E.$

A buoy, painted red, surmounted by a pole and quadrangular topmark, near the entrance to Ofa creek, in lat. $4^{\circ} 37' N.$, long. $8^{\circ} 41\frac{1}{4}' E.$

A buoy, painted black, surmounted by a pole and quadrangular topmark, northward of Atino creek, in lat. $4^{\circ} 39\frac{1}{2}' N.$, long. $8^{\circ} 39' E.$

A buoy, painted red, surmounted by a pole and quadrangular topmark, southward of the Custom house, in lat. $4^{\circ} 42' N.$, long. $8^{\circ} 38\frac{1}{2}' E.$ Positions of buoys are approximate.

The Custom house is situated in lat. $4^{\circ} 43' 33'' N.$, long. $8^{\circ} 38' 18'' E.$ See Caution ; buoyage, page 33.

Villages.—The native villages are large, and, unlike those further south, are built on the shores of the bay, and exposed to view from the water. This feeling of security is produced by vessels having seldom sought slaves in the river ; nevertheless these natives are a timid race, and there is great difficulty in holding any intercourse with them.

COAST.—At 9 miles eastward of Rio del Rey, near to Rombi village, the line of coast, after having continued in nearly an E. by S. direction from cape Formoso for 170 miles, turns abruptly to the southward along the foot of the Cameroon mountains. It is principally formed by low cliffs, hollowed in many places so as to form caverns, and at one part there are two rocky cliffs at some distance apart, connected by a gallery, perforated at equal distances by a line of apertures, resembling the work of an engineer in the excavation of a fort.

Bombo Betika point, about 10 miles southward of Rombi village and $1\frac{1}{2}$ miles northward of Madale de Coto point, is the termination of a ridge of hills, which is the boundary line of trade in these parts, that to the northward going to Old Calabar and that to the southward to Bimbia.

See chart No. 1,357.

* Reported gone. Remark book, Navigating officer, H.M.S. *Barrosa*, 1896.

Bibundi bay, on the western side of mount Cameroon, is 10 miles across, and formed by Madale de Coto point or cape Mawonge, on the north, and Debundga point to the south. Off Madale de Coto point, a reef with several rocks above high water (the highest showing 4 feet), extends south-west for $1\frac{1}{2}$ miles; and shallow sand-banks extend for 2 or 3 miles farther to the westward; the shore of the bay from the point to Bibundi river, for about 3 miles to the south-eastward, is black mud with mangrove bushes, and from the river to Debundga point it is rocky.

The river, which is difficult to make out from seaward, has a narrow entrance between a steep rocky bank on the south side and a sandy spit on the north; it is always accessible for small boats, but a steam launch drawing 5 feet would have to wait until half-flood. Just within the entrance the river forms a small harbour of about an acre in extent.

Bibundi native village, about 200 yards from the beach, is concealed by the trees. This village is the centre of the trade for the country to the west of the Cameroon mountains and for some distance northward. Southward of the mouth of the river there is a Swedish factory, which is a white house, with a black building behind it.

If entering the bay from the southward, vessels should not come nearer the shore than one to $1\frac{1}{2}$ miles, and into not less than $5\frac{1}{2}$ fathoms water. There is very good anchorage off the factory in 6 fathoms water on a muddy bottom, at about 7 cables from the shore.

Debundga point is a bold headland terminating in cliffs of red limestone from 40 to 50 feet above high water.

Lavati point, about $2\frac{1}{2}$ miles to the south-east of Debundga point, when seen from either south-east or north-west appears as a well-defined bluff, with a reef, which shows at low water, running off for about 100 yards, with probably sunken rocks extending beyond it.

Anchorage.—Off Ngdondge village, in the southern part of Bibundi bay, in $9\frac{1}{4}$ fathoms water, over sand and mud bottom, with Debundga point bearing about S.S.W., and the village about E. $\frac{1}{4}$ S.

Off Bakinki village, at half a mile from the shore, in 9 fathoms water, with a rocky and uneven bottom; Lavati point, bearing about N.W. $\frac{1}{4}$ W distant about $1\frac{1}{2}$ miles. The village is about a mile inland. There is a very good landing in a small bay close to where a stream runs into the sea.

Off Batoki village, at about $1\frac{1}{2}$ miles from Limboh point, in 10 fathoms water, on a muddy bottom, with Hulk rock, which is 50 feet above high water, and 30 yards off shore, to which it is joined by a reef of rocks, bearing N.E. by E. $\frac{1}{2}$ E., and Limboh point E.S.E. The village cannot

be seen from seaward. The landing is bad, but the best place is about 50 yards westward of Hulk rock.*

Cameroon mountain.—The base of this mountain occupies a space of nearly 20 miles in diameter, and the highest peak named Mongo-ma-Loba, is 12,992 feet above high water; it is covered with trees of luxuriant growth nearly to the summit, but one bare brown ridge, extending from the eastern side towards the sea, when seen from a short distance, appears to be composed of lava.

The peak of Cameroon stands so boldly above the surrounding pinnacles, that the descent seems unbroken, giving to the whole the appearance of one vast mountain rising from a single base, although a peak, about two miles inland, and 7 miles north-west of Amba bay, named Mongo-ma-Etindeh, or Little Cameroon, rises to a height of 5,728 feet.

Rombi mountains, lying 30 miles north of Cameroon peak, are seen towering in rude and rugged masses, affording a contrast to the apparent regularity of Cameroon mountains; their heights are from 4,000 to 6,000 feet above high water and they are perceived when more than 60 miles distant.

Kwa mountain, situated 65 miles north of Cameroon peak, is also of great elevation, and can be discerned from a distance of nearly 80 miles. Most of the above mountains, as well as the island of Fernando Po, are extinct volcanoes.

AMBA or AMBOISE BAY.—On the southern side of mount Cameroon, at the base of the peak of Mongo-ma-Etindeh, is situated Amba bay and islands.†

The northern coast of Amba bay is formed by several bights, the dividing points between which are fringed by off-lying rocks; the eastern coast is formed by a peninsula $2\frac{1}{2}$ miles long, on which there are four hills.

Morton bay, in the north-east corner of Amba bay, is accessible only to boats, being fronted by rocks.

Landing.—Beacons.—For passing between the reefs, two beacons have been put up on the point of the south-east shore, carrying two white squares, and also two beacons on the north-east shore, surmounted by two triangles having their bases turned towards each other. In entering, the first two beacons have to be kept in one until the last two come on with each other, then keep them so to the landing, which is at a wharf where boats can lie alongside.

See chart No. 1,357.

* *See Admiralty Chart:—River Cameroon with the Amba islands, No. 1,456; scale, $m = 0.7$ inch.*

† *See plan:—Amba islands; scale, $m = 1.7$ inches, on Admiralty chart No. 1,456.*

On the northern side of Morton bay is situated the missionary settlement of Victoria.

Supplies.—Wood, and generally live stock, may be obtained in abundance, the latter being much cheaper than at Fernando Po. Yams are plentiful and good, but vegetables scarce.

There is a little difficulty in obtaining a regular supply of fresh beef, owing to there being no contractor at Victoria, but a whole bullock can always be purchased; there are numerous herds of cattle, and sheep are bred in the vicinity.

Good water may be obtained in a bay on Monanga peninsula, bearing S.E. by E. from the south point of Mondoleh island.

Excellent water can also be procured near Kieh, $1\frac{1}{10}$ miles west of Victoria, but only at low tide, as the water gushes out at the foot of a rock. By excavating, however, above high-water mark, a convenient watering place might be made.

Nearly a quarter of a mile to the northward of the settlement a river runs into the bay which is convenient for washing clothes, and affords a good bathing place.

Mondoleh island.—In the bay of Amba are three small islands; the largest, Mondoleh, at the south-east part of the bay, is only half a mile long, about 200 feet above high water, and rocky, but with a level surface of rich soil, composed of decomposed basalt; the steep sides of the island are clothed with wood. There are three or four springs of water half-way up the side of the island, which, though scanty, are said to flow always. The landing is bad, but capable of improvement.

Amba island, the outer or western, is smaller than Mondoleh island, and nearly barren; the rocky slopes and summit are only clothed with a little brushwood and grass, at the southern end there are a good many lime trees and a few guavas. It is, in fact, a narrow ridge of rock, elevated at the southern extremity. Many goats and pigs feed on the precipitous sides of the island.

Landing-place.—The only landing-place at Amba island is difficult of access, on account of the rugged rocks and incessant swell; it lies near the north extreme of the island; a good pier, however, might be made with very little trouble. There is only one scanty spring of fresh water, which is occasionally dry; the inhabitants must therefore catch rain-water, and during the dry season obtain supplies from the mainland.

Bobia island, known also as Pirate island, from the supposed disposition of its natives, lies $1\frac{1}{2}$ miles N.E. $\frac{3}{4}$ N. of Amba island; it is even more barren than the other islands in this bay, and probably

formerly joined the adjacent perpendicular cliff on the mainland, as the geological structure is similar, and between them there is but a narrow channel. The process of destruction of this cliff is still going on, as enormous fragments of recently fallen rocks are lying at the north extreme of the island.

Although Bobia is much smaller than the other two islands in Amba bay, it is densely peopled, almost every available spot on its rugged surface being occupied by a hut. It is perpendicular on all sides, and the only access to the summit is by clambering up what appears to be the projection of a basaltic dike—a path available only for one at a time. The inhabitants probably owe to their impregnable position the bad character they have among their neighbours.

These islanders are the principal fishermen of the bay, which in fine weather they cover with their light canoes. This enables them to obtain by barter from the mainland, with which they are in constant communication, the scanty clothing they require, and supplies of yams, plantains, &c.

Pirate rocks, some of which are above water, extend 5 cables south-west from Bobia island, with a depth of 7 fathoms close to their southern edge.

Anchorage.—The anchorage is excellent in all parts of Amba bay, with good holding ground and depths of from 6 to 7 fathoms; although it forms a lee shore, and there is an incessant swell, the wind is said to seldom blow home so as to endanger vessels.

This is a secure anchorage all the year round; and although several severe tornadoes were experienced by H.M.S. *Flirt* in March and April, that ship did not once drag her anchors.

During the tornado season, March, April, May, and October, it is advisable to anchor with the S.E. point of Mondoleh island to the westward of S.W., and at some distance from that island, so that it should not be under the lee during tornadoes, which blow hardest from the N.E.

During the rainy season, June, July, August, and September, the best anchorage is close to the N.E. end of Mondoleh island to avoid the swell setting in from the S.W.; but during both seasons the southern point of Amba island should be shut in by the northern point of Mondoleh, bearing W. $\frac{1}{4}$ N.

Exports.—The principal exports are palm oil and india-rubber, which might be increased to a much larger extent than at present. The forests abound in good timber, and there is water power in the brook at Victoria to work a saw-mill.

Tides.—It is high water, full and change, in Amba bay at about 5h. 15m.; springs rise 7 feet, neaps 5 feet.

Tidal streams.—The tidal streams appear to run both ways for an equal period; the flood setting to the south, and the ebb to the north out of Amba's bay between Amba's island and Pirate rocks.

COAST.—Eastward of Amba's bay the coast recedes and forms a bight about a mile deep, at the western part of which there is a long inlet.

In Kriegsschiff inlet, the small bay to the westward of Cape Bimbia, there is a petroleum spring on the beach, and another a little way inland.

Cape Bimbia forms the southern extremity of the base of Cameroon mountains, the land above it rising gradually and regularly from the sea.

Nicoll island, situated $1\frac{1}{2}$ miles eastward of Cape Bimbia, lies half a mile from the shore, on the western side of the mouth of Bimbia river. Between it and the mainland on its western side is situated a sheltered anchorage off King William town, which has depths of from $2\frac{1}{4}$ to $2\frac{3}{4}$ fathoms; there is a watering-place about three-quarters of a mile to the northward of the town.

Nicoll island is 240 feet above high water, thickly wooded, and has a shoal bank extending from its western side; the north and south extremities of the island are moderately high, with a low plain between them.

Bimbia river, the entrance to which lies about $1\frac{1}{2}$ miles north east of Nicoll island, is about three-quarters of a mile wide at its mouth; it winds round the foot of Cameroon mountain, and then pursues a northerly course, and connects with the river Cameroon by Matumal and Modeaka creeks; the channel is obstructed by a bar.

The magnificent amphitheatre which forms the eastern side of Mount Cameroon is crowned with numerous villages, the inhabitants of which mostly pursue the palm oil trade.

Factories.—When entering the river the first factories seen are the Bamba plantation, three large white buildings, with white roofs, situated about half a mile eastward of Money village; and afterwards the Neger factory, a small white house with grey metal roof, near the shore at Money village, will open out.

Least depth on bar.—The least depth is $16\frac{1}{2}$ feet, and inside the bar the water deepens to 8 and 11 fathoms and the navigation appears easy up to 7 miles from the entrance.

Anchorage.—The anchorage, in about 5 fathoms water, is $1\frac{1}{2}$ miles above Nicoll island and off Dikulla bay; it is said to be perfectly safe, but the radiation from Cameroon mountain causes the heat to be very oppressive.

* See chart No. 1,456.

Tides.—It is high water, full and change, in the Bimbia river at 5h. 8m. ; springs rise 6 feet.

COAST.—From Bimbia river to cape Cameroon, in lat. $3^{\circ} 54' 20''$ N. and long. $9^{\circ} 30' 20''$ E., the distance is 14 miles in a south-easterly direction ; the shore is convex towards the sea, low, and covered with mangroves, being visible in clear weather from a distance of about 12 miles.

Depths off shore.—Between Bimbia river and Cameroon river entrance the depths were found by the German corvette *Habicht* to be from one to 2 fathoms less than as shown on the chart.

RIVER CAMEROON.—The entrance to this river is an estuary into which several streams discharge their waters ; that branch which comes from E.N.E. appears to be the most considerable. Two other rivers, Donga creek and the Kwakwa, enter the estuary from the eastward, and Malimba creek joins it immediately north of Suellaba point, the eastern entrance point.

The river Cameroon has been explored for a distance of 40 miles from the sea ; at 12 miles above Bell town and about 27 miles from the sea, the river divides into several branches ; at 90 miles from the sea further navigation is said to be obstructed by rocks. The river Kwakwa has not been explored but is described as being of less magnitude than the Wuri or Dualla (the native name of the river Cameroon above Bell town), and obstructed by rocks at about the same distance from the sea. The king of the Kwakwa country is said to reside 80 miles up the river, at a place named Longassi.

Bell town.—Bell and Akwa towns, situated on the left bank about 17 miles above Suellaba point and separated only by a little brook, are apparently of great extent and said to have a population of 10,000. The houses are neatly built of bamboo, in wide and regular streets, with numerous plantain and cocoa-nut trees, and large fields of maize. A sea wall, fronting the trading establishments, is in course of construction.

The settlements are situated on a plain, which, being elevated about 50 feet above the river, and of a sandy nature, may be considered as comparatively healthy, an inference corroborated by the appearance of the natives and the accounts of trade agents long resident in the country.

Communication.—The British and African Company's steamers call monthly, and the Hamburg steam-vessels every three weeks ; telegraphic communication with Bonny and thence with the West Coast of Africa and Europe.

Coal and supplies.—There is a coal store at river Cameroon ; the supply is uncertain, and generally patent fuel is all that can be obtained.

The water in the rivers is very bad, and stock is scarce and expensive; vessels should be provided with both.

Wharves.—The Government wharves have 23 feet water alongside.

Patent slip.—There is a patent slip capable of taking up a vessel of 800 tons: it is 150 feet in length and $29\frac{1}{2}$ feet in breadth.

Repairs.—Small repairs to machinery can be executed at the Government factory.

Quarantine.—Vessels are required to hoist the quarantine flag until pratique is granted.

Hospitals.—There is a hospital for Europeans and one for natives.

Pilots.—In the event of a boat being sent up the river for a pilot, from the anchorage south of Mianyu (Green patch point), directions should be given to keep along the northern shore for 6 or 7 miles, until east of the mouth of Modeaka creek, when, if there are any vessels lying off Bell town, their masts will be seen. Native pilots can be obtained at Old Hole point.

Trade.—A considerable trade has been carried on for many years with the natives, who, from their activity in collecting palm oil, and their intercourse with Europeans, have become a large and important community, possessing a high degree of civilization. Of late years the rubber trade has been greatly developed, and a quantity of ivory is obtained here.

The principal exports are palm oil and kernels, india rubber, ivory, timber, sugar; and imports, cotton and silk goods, powder, spirits, rice, and salt. About 90 vessels with an aggregate tonnage of 300,000 tons enter the ports.

Matumal creek (Nguba-nan-jau).—Immediately north of cape Cameroon the coast recedes and forms Mokushu bay, a deep bight 4 miles across at its entrance. At the head of this bight is situated Mikanye creek, the principal entrance to Matumal creek which communicates with Bimbria river, and is said to be navigable for vessels of 13 feet draught. Victoria and Tonde creeks, the entrances to which are on the west side of the bay, are both small, but also communicate with Matumal creek.

Mianyu (Green patch point), lying N.E. $\frac{5}{8}$ E., distant $4\frac{1}{3}$ miles from cape Cameroon, is a round point covered with green bushes and sloping from west side of the river.

Modeaka creek.—Eastward of Mianyu is the entrance to Modeaka creek, which communicates with Bimbria river.

Rugged point, on which are some trees having a very irregular outline, is the eastern point of entrance to Modeaka creek; from it the coast trends, in a east-north-east direction, for $7\frac{1}{2}$ miles to Hickory point;

at $2\frac{1}{2}$ and 5 miles, respectively, are the entrances to Bwape and Mungo creeks.

Old Hole point is on the western side of the entrance to Bwape creek and a bank which fronts the shore off this point has extended; there is a depth of 3 feet on its outer edge, at 7 cables E.S.E. of the point. Rugged point, kept to the northward of the bearing W. $\frac{1}{4}$ N., leads southward of the bank.

Mungo river, navigable only at high water, enters the river Cameroon by Mungo creek, about $2\frac{1}{2}$ miles west of Hickory point; most of the ivory brought for trade comes down this river.

Suellaba point, the south entrance point of the river Cameroon, bears S.S.E. $\frac{1}{8}$ E., distant $4\frac{1}{2}$ miles from cape Cameroon; it is a singularly long, low, and narrow point. It is reported that trees are growing within 300 yards of its extremity.

Malimba point bears N.E. by E. $\frac{7}{8}$ E., distant $8\frac{7}{10}$ miles from Suellaba point; between these points the coast forms an extensive shoal bay which receives the waters of Kwakwa river and Malimba and Donga creeks. At the mouth of Malimba creek, south-east of Suellaba point, are situated two small wooded islets.

From Malimba point the land trends N.N.W. for $1\frac{1}{2}$ miles to Mbenda point, and then N.E. by E. for $6\frac{1}{2}$ miles to Bell town, the most extensive opening between them being known as Doctor creek, situated $4\frac{1}{2}$ miles north-east of Malimba point.

Channel.—The navigable entrance to the river Cameroon, between cape Cameroon and Suellaba point, is narrowed to a width of about $1\frac{1}{2}$ miles by extensive shoals, which extend from the shore on either side. Off cape Cameroon a depth of about 3 fathoms is found at a distance of $1\frac{1}{2}$ miles from shore, the depth then suddenly increasing to 8 and 10 fathoms; great caution is therefore requisite on approaching this side of the channel, as the lead gives no warning.

The southern side of the channel is deeper than the northern, depths of from 10 to 12 fathoms being found at one mile north-west of Suellaba point.

Hundsköpfe shoals (Dog's head).—These shoals are irregular in form, and their north-east point is distant 2 miles in a west-north-west direction from Suellaba point; from this, on the side of the channel, they extend in a south-west direction for a distance of $2\frac{1}{2}$ miles, and south for about the same distance; their general width is nearly 2 miles. They almost always break heavily, and can be seen from a long distance, but are very dangerous to vessels caught in the entrance by the ebb tide, which rushes with great velocity over them, especially at spring tides.

Hundsköpfe shoals are "steep-to": on their north-west side, at half a mile from them, will be found depths of from 10 to 12 fathoms; care should therefore be taken not to approach them too closely, on account of the sudden decrease in the soundings.

Beacons and buoys.—The following beacons and buoys were in existence in 1898, but, as both are liable to be washed away, no dependence should be placed on finding them in position. (*See* Caution; buoyage, page 33.)

North Bank.—Three beacons, about $1\frac{3}{4}$ miles apart, are situated on the north side of the entrance and west of cape Cameroon; from the eastern of these beacons cape Cameroon bears E. by N., distant $3\frac{1}{2}$ miles; there is also a pyramid beacon 50 feet high on cape Cameroon.

Mianyu beacon, consisting of two white boards at right angles to one another, 330 yards south-westward of Mianyu (Green patch point).

Mukatatanda beacon of white boards, with a rectangular top, facing S.W. on the eastern extreme of Rugged point.

Pinnass beacon on the east side of the entrance to Mungo creek.

South Bank.—A beacon on Suellaba point,* and two beacons on the shore southward of it at distances of $2\frac{2}{3}$ and $4\frac{1}{2}$ miles respectively.

A white pyramid beacon 380 yards westward of Manoka point.

Mbenda beacon, $1\frac{1}{2}$ miles north-north-west of Malimba point.

Prisu a Loba beacon on Doctor point.

Yoss beacon on Yoss point.

Buoys.—Cameroon buoy, painted red and black, and surmounted by two balls, with cape Cameroon beacon bearing N.E. $\frac{1}{2}$ N., distant 9 miles, and Suellaba point E.N.E.

A buoy, lettered A. and painted red, with a basket-work cylindrical top; with cape Cameroon beacon bearing N.E. by N., distant $5\frac{8}{10}$ miles, and Suellaba point E. $\frac{7}{8}$ N.

A buoy, lettered B. and painted red, with cape Cameroon beacon bearing N. by E. $\frac{1}{4}$ E., distant $3\frac{2}{10}$ miles, and Suellaba point E. by S. $\frac{1}{2}$ S.

A buoy, lettered E. and painted red, with cape Cameroon beacon bearing W. by N. $\frac{5}{8}$ N., distant $4\frac{1}{3}$ miles; and Mianyu N. $\frac{3}{4}$ W.

A buoy, lettered F. and painted red, with Mianyu bearing N.W. by W. $\frac{7}{8}$ W., distant $2\frac{4}{10}$ miles, and Suellaba point S.W. $\frac{3}{4}$ S.

A buoy, lettered G. and painted red, with Mianyu bearing W. $\frac{7}{8}$ S., distant $4\frac{2}{10}$ miles, and Malimba point S.S.E. $\frac{5}{8}$ E.

A buoy, painted black, with Doctor point bearing E. $\frac{1}{4}$ N., distant 3 miles, and Mbenda beacon South.

* In April, 1898, Suellaba beacon was reported to be washed away, the point being flooded up to the foot of the beacon. This beacon would appear to be always replaced.

A buoy, lettered H. and painted red, with Doctor point bearing E. $\frac{1}{2}$ N., distant $\frac{9}{10}$ mile, and Old Hole point N.W. $\frac{1}{2}$ N.

A buoy, painted black, with Doctor point bearing S. by E. $\frac{1}{2}$ E., distant $\frac{9}{10}$ mile, and Yoss point E. $\frac{1}{4}$ N.

A buoy, painted red, with Yoss point E. $\frac{1}{4}$ N., distant 1 mile.

A buoy, painted red, with Yoss point bearing E. $\frac{3}{4}$ S., distant $\frac{2}{3}$ mile.

A buoy, painted black, with Yoss point bearing E. by S., distant $\frac{7}{10}$ mile, and Prisu a Loba beacon S.S.W. $\frac{1}{2}$ W.

A buoy, painted red, with Yoss point bearing S. by E., distant $\frac{1}{3}$ mile.

A buoy, painted black, with Government House bearing S.E. $\frac{1}{2}$ E., distant half a mile, and Prisu a Loba beacon S.W. $\frac{1}{4}$ W.

A buoy, painted red, on the edge of the bank off the factories.

A buoy, painted black, with the Mission bearing S.E. $\frac{1}{2}$ E., distant 4 cables.

Telegraph buoys.—A buoy, painted green, with Mianyu bearing W. $\frac{3}{8}$ S., distant $3\frac{1}{3}$ miles.

A buoy, painted green, with Doctor point bearing E. $\frac{1}{2}$ N., distant $2\frac{1}{3}$ miles.

There are two mooring buoys, painted black and white, for the use of German war vessels, also smaller buoys for local vessels.

NOTE.—Entering the river Cameroon, red buoys should be left on the starboard hand; and the black buoys on the port hand.

Outer anchorage.—Should a vessel be obliged to anchor outside river Cameroon, she may ride easily, in $6\frac{1}{2}$ fathoms water, with cape Cameroon bearing N.E. $\frac{1}{2}$ E., out of the strength of the tide.

Greatest draught.—Strangers, in vessels drawing above 16 feet water, should not go up the river without a pilot. Vessels drawing 21 feet water go up the river at spring, and 18 feet water at neap, tides.

Directions.—If the weather is not clear it is advisable to ascertain the vessel's position by making the land near cape Debundga, if from the westward, or near Amba bay if from the southward, before attempting to make Cameroon buoy. The best time for entering the river is about 2 hours before high water at Bell town.

For entering the river Cameroon, bring cape Cameroon to bear N.E. $\frac{1}{4}$ N. before getting into less than $6\frac{1}{2}$ fathoms water, and steer for it on that bearing until Manoka point is well open of Suellaba point, bearing about E. by S.; then alter course to E. by N., keeping the red buoys on the starboard hand, and anchor in 6 or 7 fathoms water, when the intervening spaces between the four small islands in Malimba creek are equal,

bearing about S. by E. The Hundsköpfe shoals being "steep-to," it is preferable to keep slightly on the northern side of the channel.

If intending to proceed up the river, when Manoka point is open of Suellaba point, steer E. by N. $\frac{1}{2}$ N. towards Malimba point, until within a short distance to the northward of the red buoy lettered E., and Mutangari point bears about N. $\frac{1}{2}$ E.; then steer N.E. $\frac{1}{2}$ N. for about 3 miles for the next red buoy, lettered F., and leaving it on the starboard hand, steer for the red buoy lettered G., off Rugged point, passing at about two-thirds of the distance the first telegraph buoy, and leaving G. on the starboard hand.

From letter G. buoy a course should be steered for the red buoy H., in line with Doctor's point, about E. $\frac{3}{4}$ N., passing close to a black buoy and the second telegraph buoy, the black buoy being first kept in line with H. and then with G. (*See Old Hole point, page 531.*)

The chart will now be the best guide to the bar, to cross which pass the red bar buoys off Yoss point at about 60 yards on the starboard hand, then steer E. by N. $\frac{1}{4}$ N. for Akwa Mission house and bring the black bar buoy right astern; keep on the line between this buoy and the Mission house until abreast of the Governor's house, when a course may be shaped for the anchorage off Akwa town, which is in 4 or 5 fathoms water, over soft bottom. If wishing to go beyond this and anchor higher up, Hickory sand must be avoided. The channel off Bell town is about 350 feet across.

The bottom in the channels of the river is very soft, and would not damage a vessel on grounding; on the bar it is hard sand and gravel. Steamers drawing 18 feet water proceed as far as Bell town.

Tides.—It is high water, full and change, at cape Cameroon at 5h. 30m.; springs rise $6\frac{1}{2}$ feet, neaps 5 feet; at Suellaba point at 5h. 20m., and at Bell town at 6h. 0m.

Tidal streams.—The strength of the tidal stream at half tide is from 2 to 3 knots an hour, and must be allowed for in the navigation of the river.

After a series of heavy rains the ebb runs from 7 to 8 hours, attaining a maximum rate of $2\frac{7}{10}$ knots an hour, while the flood runs from 4 to 5 hours, with a maximum rate of 2 knots an hour. The water-mark in the rainy season is $1\frac{1}{2}$ feet higher than in the dry season.

Anchorage.—A vessel may anchor off this coast at all seasons of the year, but never in less than 7 fathoms except in case of necessity, because, when in less than that depth, the swell begins to assume the character of rollers, and causes the vessel to ride very uneasily; indeed 10 fathoms is

a better depth for a sailing vessel, so that the anchor may be weighed and stowed before making sail.

Depths off shore. — A rough general rule for estimating the distance from the coast between cape Formoso and Old Calabar river is to allow one mile off shore for every fathom of water; thus, when in 10 fathoms, a vessel will generally be as many miles from the shore. It is almost unnecessary to add that the lead should be constantly used when in the vicinity of the land.

APPENDIX.

METEOROLOGICAL TABLES.

COMPILED BY THE METEOROLOGICAL OFFICE.

Ponta Delgada.

Cape Spartel.

Cape Juby.

Tenerife.

St. Vincent.

Porto Praya, St. Jago.

Bathurst, Gambia river.

Sierra Leone.

Cape Coast Castle.

Cameroon river.

PLACE.—PONTA DELGADA OBS. A LAT. 37° 45' N., LONG. 25° 41' W.

METEOROLOGICAL TABLE COMPILED FROM 26 YEARS' OBSERVATIONS.

MONTH.	BAROMETER, reduced to 33° and Sea Level.		TEMPERATURE.				Relative Humidity.	RAIN.		WIND.										No. of Days Gales.	No. of Days Fogs.	REMARKS.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
	Mean Height.	Ex- treme Range.	Mean Daily Range.	Max.	Min.	Total Fall.		No. of Days.	Number of Days from																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
									Average Hourly Velocity.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
										miles.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														

PLACE.—CAPE SPARTEL OBS. Δ LAT. 35° 47' N., LONG. 5° 55' W.

METEOROLOGICAL TABLE COMPILED FROM FIVE YEARS' OBSERVATIONS.

MONTH.	BAROMETER, reduced to 32 and Sea Level.			TEMPERATURE.				Relative Humidity.	Clouds, 0 to 10.	RAIN.		WIND.										No. of Days Gales.	No. of Days Fogs.	REMARKS.
	Mean Height.	Ex- treme Monthly Range.	Mean.	Mean Daily Range.		Min.	Total Fall.			No. of Days.	Average Hourly Velocity.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.				
January	Ins. 30.111	0.947	54.1	9.0	68.1	30.0	87.6	5.0	Ins. 4.452	12.8	5.6	2.0	16.4	4.6	9.6	6.2	7.2	5.0	5.4	3.4	Observations taken at 9 a.m. and 9 p.m.			
February	.146	0.807	55.9	9.2	71.5	43.4	86.2	4.0	2.816	8.0	2.8	2.8	23.6	4.0	5.6	6.8	4.8	3.2	2.8	2.2				
March	.045	1.132	57.2	10.0	81.3	43.4	83.0	4.9	4.170	11.4	3.0	4.0	16.4	3.6	5.6	10.2	10.0	5.0	4.2	2.6				
April	.032	0.843	59.4	10.1	79.5	45.7	85.7	4.2	1.950	8.4	2.6	3.8	16.2	2.0	4.6	12.0	9.8	4.6	4.4	1.6				
May	.028	.478	63.0	10.9	82.6	50.4	83.2	3.6	1.444	8.0	1.2	3.6	14.0	1.8	1.8	14.8	18.0	3.6	3.2	1.2				
June	.060	.379	69.5	12.3	92.2	54.0	77.8	2.9	0.513	3.2	1.0	3.0	23.4	1.8	1.0	9.8	12.4	4.2	3.4	4.2				
July	.040	.348	73.3	14.8	99.2	46.7	77.0	1.8	0.000	0.0	1.6	3.8	25.2	1.6	2.2	12.0	9.0	3.2	3.4	4.2				
August	.021	.314	73.7	13.2	96.5	55.0	78.0	1.9	0.008	0.4	0.8	4.0	27.4	1.4	2.0	14.6	5.4	2.6	3.8	2.4				
September	.074	.418	70.6	10.8	89.0	57.9	82.1	3.6	0.504	3.4	2.2	5.6	17.4	3.8	2.2	15.0	6.4	2.2	5.2	0.2				
October	.035	.728	66.7	10.7	90.4	41.7	81.5	4.5	3.180	7.4	2.6	2.6	20.6	5.6	5.8	10.0	5.0	2.8	7.0	4.0				
November	.105	.694	61.0	9.2	79.1	45.4	84.1	4.6	4.562	9.4	4.0	1.4	19.4	3.0	10.8	8.8	4.0	2.8	5.8	2.8				
December	30.180	0.872	56.5	8.3	72.8	44.0	84.7	4.8	4.422	10.4	6.8	1.8	14.4	4.4	12.2	5.6	6.2	6.4	4.2	2.4				
Means and Totals	30.075	1.132	63.4	10.7	99.2	30.0	82.7	3.8	28.026	82.8	34.2	38.4	234.4	37.6	63.4	125.8	98.2	45.6	52.8	31.2				

PLACE.—CAPE JUBY OBS. Δ LAT. $27^{\circ} 57' N.$, LONG. $12^{\circ} 56' W.$

METEOROLOGICAL TABLE COMPILED FROM 20 YEARS OBSERVATIONS.

MONTH.	BAROMETER, reduced to 32° and Sea Level.		TEMPERATURE.				Relative Humidity.		RAIN.		WIND.										No. of Days Tales.	No. of Days Pogs.	REMARKS.
	Mean Height.	Ex- treme Monthly Range.	Mean.	Daily Range.	Max.	Min.	Clouds, 0 to 10.	Mean Amount.	Total Fall.	No. of Days.	Average Hourly Velocity.	Number of Observations from											
												N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.			
January	Ins. 30.177	Ins. 0.863	60.6	10.0	86.0	46.0	81.5	3.7	Ins. 0.467	4.8		14.2	19.1	8.7	7.5	2.5	3.5	2.6	3.0	0.9	4.0	Observations taken at 9 a.m. and 3 p.m.	
February	.115	.698	61.3	10.2	103.6	45.0	82.6	3.7	.503	4.2		12.3	21.0	4.6	3.6	2.4	5.9	3.1	2.9	0.6	5.4		
March	.037	.611	62.5	8.3	90.4	50.0	84.9	4.5	.464	5.7		19.8	17.6	1.2	1.6	1.7	4.2	7.4	6.6	1.9	4.3		
April	.076	.466	63.8	7.0	91.2	50.5	84.0	4.7	.172	2.9		24.9	17.2	0.7	0.4	0.3	2.0	6.3	7.8	0.4	3.6		
May	.093	.389	65.0	6.4	86.0	52.4	84.4	5.4	.053	0.5		29.6	25.8	0.4	0.2	0.0	0.3	1.7	3.9	0.1	2.6		
June	.101	.420	66.9	6.0	78.0	57.7	86.6	5.9	.001	0.1		29.7	26.7	0.6	0.0	0.0	0.0	0.5	2.0	0.5	0.9		
July	.059	.348	67.6	5.1	77.7	62.1	90.5	6.2	.008	0.6		29.0	32.0	0.1	0.0	0.0	0.0	0.3	0.2	0.4	0.8		
August	.033	.290	68.4	5.4	81.8	62.2	91.8	5.6	.004	0.3		27.6	32.1	0.6	0.1	0.0	0.1	0.5	0.7	0.3	0.8		
September	.085	.381	68.9	6.3	83.6	58.7	91.1	3.8	.244	2.0		25.5	28.3	0.9	0.1	0.2	0.3	0.8	2.1	1.8	6.1		
October	.081	.370	67.5	7.6	94.0	55.2	89.2	4.0	.457	5.3		18.4	27.7	3.0	1.2	0.6	3.1	2.9	1.7	3.4	0.9		
November	.092	.512	65.4	8.8	89.0	50.2	86.1	4.1	.684	7.4		18.0	18.4	3.4	4.0	4.1	5.6	2.6	2.8	1.1	2.5		
December	.30.158	.0.747	62.4	10.4	81.4	44.0	84.0	4.1	1.082	6.2		13.0	19.7	7.9	6.4	4.3	4.9	2.6	1.7	1.5	2.9		
Means and Totals - }	30.094	0.863	65.0	7.6	103.6	44.0	86.4	4.6	4.139	40.0		262.0	285.6	32.1	25.1	16.1	29.9	31.3	35.4	12.9	28.8		

PLACE.—SITIO DE CULLEN, TENERIFE OBS. Δ LAT. 28° 25' N., LONG. 16° 13' W.

METEOROLOGICAL TABLE COMPILED FROM NINE YEARS OBSERVATIONS.

MONTH.	BAROMETER, reduced to 32° and Sea Level.		TEMPERATURE.				Relative Humidity.	RAIN.		WIND.										No. of Days Gales.	No. of Days Fogs.	REMARKS.	
	Mean Height. Range.	Ex- treme Monthly Range.	Mean Daily Range.		Max.	Min.		Total Days.	No. of Days.	Number of Observations from													
			°	°						°	°	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.				Calm.
January -	Ins. 30·175		0·927	61·8	14·3	76·2	49·1	Ins. 3·560	9·0		0·7	11·2	3·2	0·5	20·7	4·3	2·8	1·0	8·6		0·8		Observations at 9 a.m. and 9 p.m.
February -	·131		·822	62·1	15·3	79·2	48·4	1·673	6·1		0·6	11·1	1·1	0·8	22·0	5·0	2·3	0·1	13·5		1·3		
March -	·100		·763	62·6	14·3	88·5	50·0	2·787	10·3		1·1	19·7	0·3	0·4	21·3	5·3	3·0	0·7	10·2		1·0		
April -	·136		·605	64·0	13·8	81·2	52·0	1·337	5·5		4·7	20·0	2·5	0·8	16·6	4·7	3·8	1·0	5·9		0·3		
May -	·131		·570	65·9	14·0	80·4	53·2	0·401	2·3		2·3	25·1	2·6	0·4	20·1	2·6	2·3	0·4	6·2		0·1		
June -	·162		·367	69·9	14·5	83·5	54·5	0·053	0·4		1·4	33·7	0·9	0·1	16·4	1·0	0·8	0·0	5·7		0·0		
July -	·133		·331	72·6	13·4	89·9	59·3	0·027	0·5		2·0	30·2	2·0	0·0	9·7	0·0	0·3	0·0	8·8		0·0		
August -	·108		·251	73·5	13·0	88·0	61·3	0·078	0·6		3·5	33·8	0·7	0·2	10·1	1·2	0·5	0·0	12·0		0·0		
September -	·126		·319	73·1	14·3	90·1	60·0	0·295	2·0		2·7	28·1	0·5	0·0	17·0	1·0	0·5	0·2	10·0		0·0		
October -	·069		·467	71·3	13·8	86·0	56·3	2·648	7·0		2·6	21·1	0·3	0·0	21·0	4·9	2·4	0·1	9·6		0·8		
November -	·108		·792	67·0	14·0	87·9	51·0	2·423	9·3		1·3	16·2	1·5	0·0	22·7	2·2	4·8	0·0	11·3		1·2		
December -	30·190		0·745	63·7	13·8	78·8	50·6	2·503	9·3		1·0	17·2	0·3	0·1	27·7	3·9	2·4	0·1	9·3		0·3		
Means and Totals .	30·131		0·927	67·3	14·1	90·1	48·4	17·875	62·3		28·9	276·4	15·9	3·3	234·3	36·1	25·9	8·6	111·1		5·8		

PLACE.—ST. VINCENT, CAPE VERDE ISLANDS OBS. Δ LAT. $16^{\circ} 54' N$, LONG. $25^{\circ} 4'$.
METEOROLOGICAL TABLE COMPILED FROM FOUR YEARS' OBSERVATIONS.

MONTH.	BAROMETER. reduced to 32° and Sea Level.		TEMPERATURE.			Relative Humidity.	Clouds, 0 to 10.	RAIN.		WIND.								REMARKS.			
	Mean Height.	Ex- treme Range.	Mean Daily Range.	Max.	Min.			Total Fall. Days.	No. of Days.	Average force Beau- fort's Scale.	N.	N.E.	E.	S.E.	S.	S.W.	W.		N.W.	Calm.	
January	Ins. 30.083	0.319	71.4	85.1	57.2	°	4.9	Ins. 0.25	3.3	5.0	7.2	16.2	4.5	0.1	0.2	0.2	0.2	0.2	2.2	0.0	
February	0.612	0.362	70.2	78.8	62.2	°	4.5	0.19	1.5	5.6	5.3	15.8	6.6	0.0	0.0	0.0	0.0	0.0	0.6	0.0	
March	0.013	0.326	70.3	9.2	86.4	60.8	8.5	0.02	0.8	5.5	5.1	18.0	7.5	0.0	0.0	0.0	0.0	0.0	0.4	0.0	
April	0.007	0.331	71.1	8.9	88.8	61.5	8.4	0.10	0.7	5.3	5.5	17.1	7.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	
May	0.016	0.224	72.6	8.6	88.1	64.8	3.6	0.0	0.0	5.7	6.7	16.4	7.8	0.0	0.0	0.0	0.0	0.0	0.1	0.5	
June	30.083	0.319	74.2	8.8	86.4	63.2	4.1	0.01	0.2	5.2	8.2	17.0	4.0	0.0	0.0	0.0	0.1	0.3	0.4	0.2	
July	29.989	0.335	76.3	9.8	91.6	66.7	5.2	0.18	2.5	4.8	9.4	14.5	5.5	0.2	0.1	0.0	0.0	0.1	1.2	0.8	
August	0.926	0.279	78.8	9.7	91.4	70.0	6.1	2.39	8.3	4.3	7.8	16.8	3.1	0.2	0.2	0.0	0.2	0.2	3.0	0.0	
September	0.970	0.300	79.5	9.2	96.3	71.2	5.0	4.15	5.8	4.8	7.3	16.8	3.7	0.2	0.1	0.1	0.1	0.3	1.4	0.2	
October	0.962	0.425	78.9	9.2	92.3	68.2	4.6	1.97	3.7	4.5	5.9	17.3	3.3	0.2	0.3	0.5	0.5	0.3	2.7	1.2	
November	0.983	0.350	76.3	8.8	86.4	62.8	5.1	0.73	1.7	4.7	7.2	18.4	1.8	0.0	0.3	0.3	0.2	0.3	1.5	0.2	
December	29.995	0.264	74.0	9.5	90.5	59.4	4.8	0.92	3.0	4.3	7.3	16.6	1.8	0.1	0.3	0.3	0.4	0.6	3.6	0.0	
Means and Totals	29.995	0.472	74.5	9.0	96.3	57.2	4.6	10.91	31.5	5.0	82.4	200.9	56.6	1.0	1.5	1.4	1.7	2.3	17.5	8.1	

* NOTE.—Fog (Nevoeiro) observations here, and at Porto Praya seem untrustworthy, but it is evident that there is a great deal of misty haze, if not fog, in the locality.

ST. VINCENT.	No. of Days.		PORTO PRAYA.	No. of Days.	
	FOG (Nevoeiro).	DUST HAZE (Nevoeiro Secco).		FOG (Nevoeiro).	DUST HAZE (Nevoeiro Secco).
1884	-	-	-	-	266
1885	-	-	-	-	285
1886	-	-	-	-	226
1887	-	-	-	-	226
	119	102	1886 -	0	266
	125	56	1887 -	0	285
	127	53	1884 -	4	226
	116	83	(10 months)	-	-

PLACE.—PORTO PRAYA, ST. JAGO, CAPE VERDE ISLANDS OBS. Δ LAT. $14^{\circ} 54' N$, LONG. $23^{\circ} 31' W$.

METEOROLOGICAL TABLE COMPILED FROM 9-11 YEARS' OBSERVATIONS.

MONTH.	BAROMETER, reduced to 32° and Sea Level.		TEMPERATURE.				Relative Humidity.	Clouds, 0 to 10.	RAIN.		WIND.								REMARKS.		
	Mean Height.	Ex- treme Range.	Mean.	Daily Range.	Max.	Min.			Total Fall.	No. of Days.	Average Force, Beau- fort's Scale.	Number of Days from									
												N.	N.E.	E.	S.E.	S.	S.W.	W.		N.W.	Calm.
January	Ins. 29.981	Ins. 0.260	72.8	9.9	93.7	62.6	°	4.1	Ins. 0.08	1.1	5.2	12.8	10.2	5.8	0.3	0.0	0.6	0.0	0.3	1.0	4 YRS. 0.0
February	- 981	- 301	73.0	11.1	93.9	59.0	°	4.0	0.04	0.6	5.2	12.3	6.4	7.6	0.1	0.2	0.6	0.0	0.6	0.2	0.1
March	- 984	- 300	73.5	11.5	90.0	61.0	°	3.5	0.0	0.6	5.2	14.5	10.2	3.2	0.1	0.6	0.5	0.0	0.4	1.5	0.0
April	- 989	- 283	73.9	10.6	87.4	64.4	°	2.7	0.01	0.1	5.3	15.0	8.1	3.1	0.1	0.6	1.1	0.5	0.7	0.8	0.0
May	- 30.016	- 229	75.6	11.2	94.6	64.0	°	2.4	0.0	0.0	5.0	15.6	8.2	2.5	0.6	0.8	0.3	0.1	1.6	0.8	0.2
June	- 028	- 240	76.9	11.0	92.3	65.1	°	3.2	0.01	0.2	4.1	13.0	8.3	3.6	0.8	0.8	1.2	0.8	0.8	0.7	0.0
July	- 30.016	- 315	78.2	8.6	90.5	70.0	°	5.9	0.58	2.1	4.3	9.5	10.3	3.0	1.8	1.6	1.6	0.7	0.6	1.9	0.2
August	- 29.954	- 256	79.6	8.0	92.3	67.8	°	6.6	3.95	8.9	4.0	7.0	7.5	4.0	2.7	2.5	2.8	1.2	0.8	2.5	0.0
September	- 963	- 283	80.3	8.5	95.6	68.9	°	5.5	4.02	7.8	3.9	8.2	8.9	3.1	1.9	0.8	2.6	0.7	1.4	2.4	0.0
October	- 968	- 252	80.0	9.4	93.9	71.6	°	4.0	1.43	2.8	4.8	9.0	11.4	5.8	1.3	0.8	0.8	0.1	0.0	1.8	0.0
November	- 977	- 315	78.0	9.3	97.2	68.0	°	4.3	0.81	1.0	4.4	9.4	8.8	7.6	1.4	0.7	0.1	0.0	0.1	1.9	0.0
December	- 29.986	- 0.224	75.3	9.6	91.4	64.0	°	4.5	0.40	0.9	4.4	11.0	8.2	6.9	0.6	0.6	1.0	0.6	0.8	1.3	0.0
Means and Totals.	29.989	0.371	76.4	9.9	97.2	59.0	°	4.2	10.83	25.5	4.7	137.3	106.5	56.2	11.7	10.0	13.7	4.7	8.1	16.8	0.5

* See Remarks, St. Vincent.

PLACE.—BATHURST, GAMBIA OBS. A LAT. 13° 28' N., LONG. 16° 36' W.

METEOROLOGICAL TABLE COMPILED FROM ONE YEAR'S OBSERVATIONS.

MONTH.	BAROMETER, reduced to 32° and Sea Level.		TEMPERATURE.				Relative Humidity.	RAIN.		WIND.										No. of Days Gale.	No. of Days Fog.	REMARKS.	
	Mean Height.	Ex- treme Range.	Mean.	Daily Range.	Max.	Min.		Total Fall.	No. of Days.	Average Hourly Velocity.	Number of Observations from												
											N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.				
January -	Ins.	Ins.	70·6	36·5	°	°	°	1·7	Ins. 0·025	1	13	37	2	1	1	0	0	0	1	7	Observations taken at 8 a.m. and 8 p.m.		
February -			69·8	34·5	94·2	43·0	1·7	—	0	13	37	2	1	0	0	0	1	2	2				
March -			73·6	40·4	105·0	50·2	1·0	—	0	6	31	3	0	1	5	1	4	11					
April -			73·0	33·9	100·5	49·5	1·2	—	0	1	33	0	0	0	11	0	3	12					
May -			72·5	30·8	96·8	50·0	1·3	—	0	1	36	0	0	0	15	0	1	9					
June -			77·3	29·5	98·8	53·2	3·1	0·753	3	4	34	0	0	0	11	0	1	10					
July -			78·8	28·2	95·5	52·8	4·9	8·471	13	12	25	0	0	0	18	0	2	5					
August -			78·9	31·6	92·0	52·5	4·2	14·600	13	4	23	3	1	3	14	0	1	13					
September -			80·3	32·4	92·0	52·0	3·7	16·491	18	4	18	0	2½	7	1	0	2	4					
October -			80·8	14·6	96·0	69·8	2·7	5·045	7	1	9	0	2	1	10	1	7	31					
November -			79·0	19·6	97·5	63·0	1·7	—	0	1	30	0	2	1	0	0	4	22					
December -			73·3	36·0	95·0	48·8	0·5	—	0	5	47	4	0	0	0	0	3	3					
Means and Totals - }			75·7	30·7	105·0	43·0	2·3	45·385	55	65	360	14	81	14	85	3	31	129					

PLACE.—SIERRA LEONE. Δ LAT. 8° 30' N., LONG. 13° 9' W.

METEOROLOGICAL TABLE COMPILED FROM 19 YEARS' OBSERVATIONS.

MONTH.	BAROMETER, reduced to 32° and Sea Level.		TEMPERATURE.				Relative Humidity.		RAIN.		WIND.										REMARKS.
	Mean Height	Ex- treme Monthly Range.	Mean.	Daily Range.	Max.	Min.	Clouds, 0 to 10	Total Fall.	No. of Days.	Number of Observations from											
										Average Hourly Velocity.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.		
January	Ins. 29.907	Ins. 0.260	81.6	17.4	96.0	61.0	77.1	3.2	0.618	0.9	9.3	5.4	12.1	2.9	7.0	2.8	11.1	4.0	7.4	Observations taken at 9 a.m. and 3 p.m. Barometer readings, humidity and cloud are the means of readings at 9 a.m. and 3 p.m. Mean temperature [is the mean of maxi- mum and minimum.	
February	.914	.261	82.3	17.1	98.0	61.0	74.5	3.2	0.522	0.6	8.2	3.4	7.1	1.8	7.4	4.5	14.5	4.8	4.8		
March	.909	.279	82.6	16.9	99.8	63.0	74.2	3.3	1.050	2.9	11.8	1.9	4.6	1.6	10.0	6.3	16.8	5.4	3.6		
April	.906	.232	83.1	16.8	98.0	60.0	75.1	3.5	5.339	6.7	10.5	2.1	5.0	1.7	7.8	6.4	17.3	4.4	4.8		
May	.928	.250	82.3	17.4	99.0	58.2	78.9	3.8	14.809	16.5	8.5	3.0	10.0	1.6	8.5	5.3	15.0	3.8	6.3		
June	.952	.253	80.9	15.9	98.0	62.0	81.2	3.8	21.337	21.8	8.1	1.4	9.4	2.1	8.1	4.3	15.6	3.3	7.7		
July	.967	.249	79.6	14.5	97.0	62.0	83.5	3.9	36.834	25.4	7.0	1.6	4.8	2.0	8.1	6.2	19.0	3.3	10.0		
August	.965	.237	78.7	13.4	99.0	60.0	84.4	3.7	39.600	24.8	7.8	0.9	3.8	1.7	8.9	8.0	21.1	2.4	7.4		
September	.944	.270	79.3	13.8	96.0	62.0	84.6	3.9	32.503	24.2	7.3	1.2	5.7	1.7	7.7	7.0	23.9	2.1	8.4		
October	.926	.263	80.6	16.4	98.4	64.0	81.7	3.8	15.209	19.4	5.9	3.1	10.4	1.7	7.3	5.9	15.9	2.8	9.0		
November	.912	.242	81.4	17.1	98.9	63.0	79.2	3.6	5.302	9.7	7.4	3.3	10.1	2.1	7.1	4.0	12.8	3.3	9.9		
December	.900	.295	81.7	16.8	96.0	62.4	78.7	3.2	1.286	3.1	8.6	4.4	11.6	2.2	6.7	2.9	10.7	3.8	11.1		
Means and Totals	.928	.295	81.2	16.1	99.8	58.2	79.4	3.6	174.409	155.0	1.00.4	31.7	94.6	23.1	94.6	63.6	138.7	43.4	90.4		

PLACE.—CAPE COAST CASTLE OBS. Δ LAT. 5° 6' N., LONG. 1° 14' W.

METEOROLOGICAL TABLE COMPILED FROM ONE YEAR'S OBSERVATIONS.

MONTH.	BAROMETER, reduced to 32° and Sea Level.		TEMPERATURE.				Relative Humidity.		RAIN.		WIND.										No. of Days Gales.	No. of Days Fogs.	REMARKS.			
	Mean Height. Range.	Ex- treme Range.	Mean.	Daily Range.	Max.	Min.	Clouds, 0 to 10.	Total Fall.	No. of Days.	Average Hourly Velocity.	Number of Days from															
											N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.							
January -	Ins.	Ins.	°	°	°	°		Ins.	—																	Mean tem- perature is the mean of the maximum and mini- mum.
February -			80.4	12.2	88.0	68.0		0.000																		
March -			82.7	11.8	96.0	74.0		0.910	2																	
April -			83.6	12.1	92.0	72.0		6.580	4																	
May -			82.5	12.4	97.0	68.0		4.370	6																	
June -			81.1	10.8	96.0	71.0		16.610	13																	
July -			78.6	10.3	89.0	70.0		9.400	8																	
August -			76.6	10.2	90.0	63.0		2.450	5																	
September -			75.8	11.3	88.0	68.0		0.850	5																	
October -			75.8	10.1	83.0	69.0		1.140	4																	
November -			80.0	11.9	91.0	71.0		5.960	13																	
December -			82.3	13.6	91.0	74.0		0.340	1																	
Means and Totals - }			81.0	11.7	91.0	75.0		0.000	—																	
			80.0	11.5	97.0	63.0		48.610	61																	

PLACE.—CAMEROON RIVER OBS. Δ LAT. 4° 5' N., LONG. 9° 45' E.

METEOROLOGICAL TABLE COMPILED FROM THREE YEARS' OBSERVATIONS.

MONTH.	BAROMETER, reduced to 32° and Sea Level.		TEMPERATURE.			Relative Humidity.	RAIN.		WIND.										No. of Days Gales.	No. of Days Fogs.	REMARKS.		
	Mean Height.	Ex- treme Range.	Mean.	Daily Range.	Max.		Min.	Total Fall.	No. of Days.	Average Force, Beaufort's Scale.	Number of Days from												
											N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.				Calm.	
January	Ins. 29.855	Ins. 0.319	79.4	11.0	88.3	69.6	Ins. 2.37	9.7	1.7	0.4	3.0	1.9	1.1	1.9	10.9	4.1	0.2	7.5	0.0	17.3			
February	Ins. 854	Ins. .331	80.6	12.1	89.4	68.2	Ins. 3.34	11.3	2.0	0.0	2.5	2.4	0.8	2.3	9.2	4.9	0.2	5.7	0.0	9.3			
March	Ins. 851	Ins. .256	79.8	13.0	88.2	67.8	Ins. 8.40	15.3	1.9	0.2	1.8	3.3	1.3	2.9	10.1	6.5	0.4	4.5	0.0	6.7			
April	Ins. 863	Ins. .244	79.5	12.2	90.5	68.7	Ins. 7.36	15.7	1.8	0.8	3.7	3.0	1.0	0.7	10.0	1.7	0.4	8.7	0.3	3.7			
May	Ins. 905	Ins. .244	79.4	11.3	91.2	69.1	Ins. 10.59	19.3	1.6	1.8	2.3	1.2	0.7	0.9	11.8	1.7	0.3	10.3	0.0	2.7			
June	Ins. 960	Ins. .248	77.7	9.0	90.0	70.5	Ins. 22.30	22.0	1.6	0.8	1.8	1.1	0.9	1.7	13.3	1.3	0.1	9.0	0.0	5.7			
July	Ins. 972	Ins. .244	75.3	7.0	85.5	67.3	Ins. 36.02	27.0	1.8	0.2	1.4	1.1	1.9	1.6	13.9	2.4	0.2	8.3	0.0	7.3			
August	Ins. 968	Ins. .209	75.5	8.0	85.3	67.8	Ins. 21.96	24.7	2.0	0.3	1.3	0.8	1.3	1.8	16.0	2.0	0.4	7.1	0.0	11.3			
September	Ins. 936	Ins. .197	76.3	9.0	86.0	68.2	Ins. 19.27	25.0	1.9	0.6	2.4	1.2	1.2	0.4	12.6	1.7	0.2	9.7	0.0	5.3			
October	Ins. 900	Ins. .267	76.6	10.0	87.3	68.9	Ins. 20.15	21.3	1.8	0.6	4.7	1.9	1.0	0.3	12.0	1.8	0.1	8.6	0.0	5.7			
November	Ins. 872	Ins. .307	78.7	10.2	87.8	68.5	Ins. 4.62	13.3	1.8	0.7	4.0	1.6	0.8	0.1	10.9	1.9	0.0	10.0	0.0	16.7			
December	Ins. 29.871	Ins. 0.378	79.3	11.0	87.8	68.4	Ins. 3.62	8.0	1.5	0.2	3.2	1.3	0.1	0.2	10.6	3.4	0.0	12.0	0.0	28.3			
Means and Totals	29.900	0.414	78.2	10.3	91.2	67.3	160.09	212.6	1.8	6.6	32.1	20.8	12.1	14.8	141.3	33.4	2.5	101.4	0.3	115.0			

M M 12

INDEX.

A.		Page		Page
Abbey Dome hill	-	419	Addabrass creek	453
Abeokuta or Ogun river	-	443	Addafoa	420
———, railway	-	439	———, anchorage	420
———, town	-	443	———, communication	420
Abi lagoon	-	388	———, dispensary	420
Abinsi, Benue river	-	487	———, landing	420
Abo, Nun river	-	475	Addo or Yewa river	437
Aboaddi point	-	400	Adoblo rock	397
———, landing	-	400	Aebi river	387
Abokori islet	-	397	Ætna patches	292
Abomey	-	436	Aferni Ras or cape Ghir	127
Abrapa cliffs	-	379	Afoa or Porura	431
——— point	-	379	——— boundary	431
Abroti river	-	403	African knoll, buoy	257
Abu Ketu boulder	-	408	Afugu or Ivory town	384
Abutshi	-	482	Aga hill	409
Accra	-	414	——— point	409
———, anchorage	-	416	Agardir or Santa Cruz	127
———, communication	-	415	———, anchorage	128
———, depths off shore	-	416	———, current	47
———, earthquakes	-	416	———, supplies	128
———, hospitals	-	416	———, tides	128
———, landing	-	415	Aganotokula (Whale) island	496
———, light	-	414	Agberi	475
———, point	-	414	Agoa point	92
———, signals	-	416	Agostinho point	152
———, submarine telegraph cable,			Agula, cape	128
buoy	-	416	———, village	129
supplies	-	415	Agulha point	95
tides	-	417	Agweh	433
time signal	-	416	———, anchorage	433
town	-	415	Ahanta point	396
Achowá, depths off shore	-	395	Ahorokoa point	381
———, point	-	395	Ainsu river	412
———, rocks	-	395	Ajarra creek or river	436
———, village	-	396	Ajfenir point	134
Adaffia	-	431	Ajimo (Odi vista)	445
———, depths off shore	-	431	Ajua, communication	398
Adamawa mountains	-	486	reef	398
Adda, Big, Volta river	-	421	village	398
			Ajuda point, landing	94
			Akal aki village	403
			Akanko	390

	Page		Page
Akassa - - -	469	Allen rocks - - -	355
——, coal - - -	470	Alligator island - - -	517
——, communication - - -	470	—— point - - -	305
——, creek - - -	473, 495	—— stream - - -	395
——, patent slip - - -	470	Almadi ledge - - -	216
——, repairs - - -	470	——, light - - -	215
——, supplies - - -	470	——, point - - -	215
——, weather, &c. - - -	40	Almeida fort - - -	166
Akba or Komoe river - - -	387	Almirante rock - - -	109
Akem peak - - -	414	Alta Garaoné mountain - - -	162
Akiabu river - - -	403	Altona - - -	478
Akimfu - - -	403	Alvaro Rodriguez island - - -	66
Akol hill - - -	375	Amamzara river - - -	483
Akrumasi point - - -	390	Amanay point - - -	182
Akuna Kuna country - - -	522	Amarante shoal - - -	310
Akwa point - - -	520	Ambas or Amhoise bay - - -	526
—— town - - -	530	——, anchorage - - -	528
Akwamobugo or Fishtown creek - - -	495	——, exports - - -	528
Akwayafe river - - -	521	——, landing - - -	526
——, climate - - -	21	——, supplies - - -	526
——, tides - - -	523	——, tidal streams - - -	529
Akwida cove - - -	395	——, tides - - -	528
—— fort - - -	395	—— island, landing - - -	527
—— point - - -	394	Amfur rivulet - - -	408
—— rock - - -	395	Amidika - - -	422
Akwiji village - - -	431	Amisa river - - -	410
Akwita creek - - -	512	Amkwana village - - -	404
——, factory - - -	512	Amokwa or Half Jack - - -	384
Akwon hill - - -	408	——, communication - - -	384
Alagico creek - - -	460	Ampeni point - - -	403
Alagoa bay - - -	91	—— town - - -	403
—— point, town - - -	91	Anaga point - - -	165
Albani hills - - -	389	——, caution - - -	165
—— river - - -	388	—— rocks - - -	165
Albemarle mountains - - -	488	Anama point - - -	394
Albernas point - - -	68	Anamaboe fort - - -	408
Albreda - - -	265	——, anchorage - - -	409
——, directions - - -	265	——, communication - - -	409
——, tidal streams - - -	268	Anamkwon river - - -	400
——, tides - - -	265	Anashun point - - -	408
Alburka channel - - -	474	Andoni or Antonio river - - -	510
—— island - - -	474	Angel bank - - -	207
Alcatraz island, anchorage - - -	293	—— hillocks - - -	207
—— reef - - -	293	Angiáma - - -	474
Alecto hill - - -	264	Angra bay and anchorage - - -	84
Aldea point - - -	161	——, communication - - -	84
—— valley - - -	181	——, light - - -	83
Alepé, Akba river - - -	387	——, signals - - -	84
Alldridge island - - -	336	——, tides - - -	84
Allegranza island - - -	190	—— city - - -	83
——, depths off shore - - -	190	—— de Caballo, anchorage - - -	194
——, landing place - - -	190	—— de Cintra bay - - -	197
——, light - - -	190	——, fishery - - -	198

	Page		Page
Angra de Cintra bay, rollers	198	Arnel point - - -	93
———, water	198	———, light - - -	93
——— de los Ruiros - - -	193	———, signals - - -	93
Ankobra river - - -	389	Aro - - - - -	443
———, bar - - -	390	Arrecife port - - -	188
Ankora islands - - -	282	Arrieta bay - - -	187
———, anchorage - - -	282	——— village - - -	187
———, point - - -	282	Arrife point - - -	75
———, landing - - -	282	Arriskado banks - - -	283
Anna Ferreira peak - - -	154	Arsila - - - - -	110
Anse du Dragonnier - - -	311	——— anchorage - - -	110
Antequerra point - - -	166	Artlett shoal - - -	112
Antonio or Andoni river - - -	510	Aruka village - - -	461
Apoasi bluff - - -	399	Asa creek and town - - -	512
——— village - - -	399	Asaba, supplies - - -	483
Apollonia cape or hummocks - - -	389	Asc - - - - -	475
——— fort - - -	389	Ashanti - - - - -	420
Appam point - - -	411	Assakri rocks - - -	411
———, anchorage and wreck - - -	411	Assay point, Gold hill - - -	403
———, communication - - -	411	Asses ears mountain - - -	182
———, landing - - -	411	Assini Half or Ewiano - - -	388
———, tides - - -	411	———, hills - - -	388
Appi, <i>see</i> Kotonu - - -	435	———, lagoons - - -	388
Appra mount - - -	413	———, river - - -	387
Arabi-el-Said, battery - - -	106	———, anchorage - - -	387
Arago, Benue river - - -	487	———, town - - -	388
Arcas channel - - -	286	———, communication - - -	388
———, anchorage - - -	286	Atalaya point - - - - -	140
———, buoys - - -	286	Atane - - - - -	482
———, tides - - -	287	Athol rock - - - - -	369
——— flat - - -	286	Atlantika mountains - - -	489
Archimedes bay - - -	201	Atlas range - - - - -	128
Arco peak - - -	150	Atoka - - - - -	422
Arcia Branca shoal - - -	287	Augustenborg fort - - -	417
——— buoy - - -	287	Avila bay - - - - -	188
——— point - - -	240	Avon waters or Hako lagoon - - -	432
Arethusa reef, Tamara island - - -	308	Avons deep - - - - -	444
Areval basin - - -	90	Axim bay - - - - -	390
Areynaga point, light - - -	180	———, anchorage - - -	392
Arguin bank - - -	205	———, caution - - -	391
———, depths off shore - - -	205	———, coal and supplies - - -	390
——— bay, anchorage - - -	205	———, communication - - -	390
———, beacons and buoys - - -	205	———, dangers - - -	391
———, least depth - - -	205	———, depths off shore - - -	392
———, tidal streams - - -	205	———, landing - - -	390
———, tides - - -	205	———, shoul - - -	391
———, cape - - -	204	———, tides - - -	392
———, island - - -	204	———, trade - - -	392
———, winds - - -	86	———, water - - -	392
——— point - - -	148	Ayakromo village - - -	464
Arguinequin bay, anchorage - - -	181	Azimur point - - -	117
Arlett bank - - -	282	——— spit - - -	117
——— point - - -	282	——— town - - -	117

	Page		Page
Azimur town, refraction -	117	Bakkasi gap -	518
Azores or Western islands -	23, 64	_____ to Rio del Rey -	523
_____, barometer	41	_____, head -	518
_____, climate -	25	_____, peninsula -	523
_____, communi-		_____, river -	518
_____, cation -	25	Bakinki village, anchorage -	525
_____, currents -	51	Bakundi -	488
_____, flora and		Balanger -	266
_____, fauna -	24	Balantes bay -	282
_____, fog -	41	_____, anchorage -	284
_____, geology -	24	Bald cape -	270
_____, population	24	_____, depths off shore -	256
_____, ports -	25	Baleine stream -	224
_____, produce -	25	Baleur bank, buoys -	501, 502
_____, tides -	25	_____, inner -	501
_____, winds and		_____, outer -	501
_____, weather	41	Ballena point -	182
Azuminé creek -	511	_____, light -	182
		_____, pier -	183
		Ballo point -	322
		Bamba plantation -	529
		Bammako, river Niger -	476
		Bañaderos bay -	173
		Banana islands -	328
		_____, anchorage -	328
		_____, channel east of -	329
		_____, dangers -	328
		_____, observation spot -	329
		_____, peak -	335
		_____, supplies -	328
		_____, tides -	329
		_____, winds and weather -	38
		Bance island -	322
		Bangers pillar -	142
		Bani river -	476
		Banjala creek -	255
		_____, tidal stream -	255
		Bankoia village -	303
		Bantanta creek -	267
		Baruko point -	413
		Barbas cape, anchorage -	199
		Barel point -	290
		Barella breaker -	275
		_____, cape -	274
		Bargui village -	223
		Barka river -	408
		Barlovento point -	162
		Barometer, general observations -	44
		Barra point -	258
		Barracoon point -	469
		Barracouta rock -	399
		Barrada creek -	255
		Barranco Honda point -	170
		Barrette point -	307

B.

Babli point -	410
Baboon islands -	267
Bacaba -	463
_____, shoal -	464
Bacha rock -	150
Badagri -	437
_____, anchorage -	437, 438
_____, current -	438
_____, mount -	437
Baddu -	360
_____, or Esereus river -	360
_____, shoals -	360
Bae -	433
Baffni river -	353
Baffu bay -	353
_____, point -	353
_____, directions -	353
_____, rock -	353
Bagida -	432
Bagru channel -	333
_____, river -	337
Bai Ya or Devil rock -	352
Baixio Grande point -	75
Baixo island -	156
_____, depths off shore -	157
Bajibo -	477
Bakana -	509
_____, creek -	509
_____, directions -	509
_____, factories -	509
Bakel -	210

	Page		Page
Barrosa island - - -	454	Bellansang point - - -	317
Bartensteen or Butri fort - - -	397	Bell town - - -	530
----- hill - - -	397	Bencer point - - -	296
Basha Grand river - - -	373	Bendu village - - -	336
----- point - - -	373	Bengalong - - -	303
Bassa creek - - -	474	Bengal rocks - - -	330
----- cove, anchorage - - -	347	Benin, bight of - - -	423
----- hills - - -	346	-----, anchorage - - -	426
----- Grand - - -	346	-----, character of coast - - -	423
----- point - - -	348	-----, caution - - -	425
-----, tides - - -	348	-----, currents - - -	50
----- Middle - - -	346	-----, depths off shore - - -	425
----- point - - -	345	-----, discoloured water - - -	424
----- river, Little - - -	345	-----, lagoon outfalls - - -	424
----- villages - - -	375, 376	-----, landing - - -	426
Bassam Grand, <i>see</i> Grand Bassam - - -	385	-----, leeward or south- eastern shore - - -	424
Bassubu rocks - - -	401	-----, off shore anchorage - - -	426
Batari creek, Benin river - - -	455	-----, smokes - - -	428
Bathurst - - -	258	-----, tidal streams - - -	428
-----, anchorage - - -	259	-----, tides - - -	428
-----, climate - - -	7	-----, tornadoes - - -	39
-----, coal - - -	258	-----, watering - - -	427
-----, communication - - -	258	-----, winds and weather - - -	39
-----, directions - - -	259	-----, windward or western shore - - -	424
-----, hospital - - -	259	-----, city - - -	455
-----, lights - - -	259	-----, creek - - -	463
-----, piers - - -	259	-----, river - - -	449
-----, pilots - - -	259	-----, road - - -	451
-----, supplies - - -	258	-----, above anchorage - - -	453
-----, tidal streams - - -	261	-----, anchorage - - -	452
-----, tides - - -	261	-----, bar - - -	451
-----, trade - - -	259	-----, dangers inside the - - -	452
Batima creek - - -	269	-----, buoy - - -	451
Batoki village, anchorage - - -	525	-----, communication - - -	450
Battery point, Benin river - - -	452	-----, currents off - - -	452
Batur - - -	279	-----, landmarks - - -	450
Baxio point - - -	68	-----, navigability - - -	450
----- Raza islet - - -	68	-----, pilots - - -	451
----- landing; supplies - - -	68	-----, stations on the river - - -	449
Baxios point - - -	82	-----, tidal streams - - -	452
Baxo rock - - -	80	-----, tides - - -	452
Bayadere banks - - -	204	-----, villages - - -	453
Beaver, port - - -	286	Benkia - - -	322
Becerro point, anchorage - - -	163	Benson river - - -	346
Beckenstein redoubt - - -	405	Benti point - - -	317
Bedford mount - - -	382	Benue river - - -	486
----- point, shoal - - -	460	----- level of river - - -	479
Beecroft point - - -	439	Benu Mboro village - - -	214
Beggars bank - - -	288	Bequio Island - - -	211
Beh beach or Lumeh - - -	432	Berebi coppice - - -	374
Belair factory - - -	298	-----, Grand - - -	375
----- point - - -	221		
----- shoal - - -	221		

	Page		Page
Berebi, Half	374	Bissao, supplies	284
Berefet creek	261	——, tidal streams	285
Bermeja rock	162	——, tides	285
Bernafel point	285	——, trade	285
Bernard point	222	Bissaw river	348
Bétenti village	255	Black rock	112
Beya river	404	Blanco, cape	200
Beyh river	380	——, anchorage	201
Biafara, bight of	491	——, directions	203
Biafares island	289	——, False	200
Biahuin village	371	——, Spanish boundary	201
Bibo river	404	——, tidal streams	204
Bibundi bay	525	——, tides	204
—— village	525	——, North	119
Bicho bank	292	——, anchorage	119
Bicudas, punta das	245	——, current	46
Bida, Niger river	485	——, depths off shore	119
Bifara village	490	——, tides	119
Bifeche island	211	Blieron village	371
Bighude point	248	Blind creek	468
Big island, Brass river	492	Bliss river	271
——, Pongo river	303	Blisset reef	244
Bijol islands	256	Bluba river	355
Bijouga or Bissagos islands	280	Blubarra point	355
—— remarks	281	Blukus village	431
—— breaker	281	Boa Ventura rock	150
Billee creek	509	—— Vista church	67
Bimbia, cape	529	Boat channel, Bonny, and New Calabar	507
—— river	529	—— passage, cape Palmas	368
——, anchorage	529	Bobia island	527
——, bar, least depth	529	——, flat	333
——, depths offshore	530	Bobowasi island	391
——, factories	529	Bobs island	333
——, tides	530	——, flat	333
Biombo point	282	——, tides	338
Biquese factory	294	Boca del Perejil	187
Bird or Jow island, St. Vincent		Bocayna strait	183
island, <i>see</i> Passaro island	229	——, depth in	184
—— island, Sal island, <i>see</i> Passaro	238	Bofa, Benue river	487
—— bank or Red bank	254	Boffa	302
——, caution	256	——, anchorage	303
——, spit	255	——, directions	303
Biscoito point	75	Boidan rock, cape Three points	393
Bissagos or Bijouga islands	280	Bojador, cape	192
Bissagua island	289	——, current	46, 47
Bissao	284	——, depths off shore	193
——, communication	284	——, tides	192
——, directions	285	——, False	136
——, firewood	284	Boké village	298
——, fort	285	Boler creek, Bonny river	508
——, fresh water	284	Boler's pier	503
——, prohibited anchorage	285	Bolola channel	288
		—— point	275

	Page		Page
Bolola river or Rio Grande - -	289	Branças island - - -	152
—— village - - -	275	Brauco point - - -	155
Boma point - - -	464	Brandenburg bay - - -	392
Bombo Betika point - - -	524	—— fort - - -	392
Bomplake channel - - -	333	Branu river - - -	404
Bonavista or Boavista island -	239	Brass river, Rio Bento or St. John -	491
——, anchor-		——, anchorage, inner -	494
——, ages -	239	——, ——, outer -	494
——, caution ;		——, bar, greatest draught -	494
——, current -	239	——, buoy - - -	494
——, rollers -	239	——, communication -	492
Bondali - - -	261	——, directions - - -	494
Bonny river - - -	502	——, landmarks - - -	493
——, anchorage, inner -	504	——, pilots - - -	494
——, ——, outer -	504	——, settlement - - -	492
——, directions - - -	404	——, supplies - - -	492
——, piers - - -	503	——, tidal streams - - -	497
——, pilots - - -	503	——, tides - - -	497
——, position - - -	503	Brava island - - -	249
—— to Old Calabar river -	519	——, anchorages - - -	249
—— and New Calabar rivers -	499	——, light - - -	249
—— channel, buoys - - -	504	——, pilots - - -	249
——, submarine telegraph cables -	503	——, supplies - - -	249
—— town - - -	502	——, tides - - -	249
——, coal and supplies -	503	Brazen head, <i>see</i> Garajao, cape -	140
——, communication - -	503	—— hill bluff (Orvatão) -	242
——, tidal stream - - -	510	Brazier point - - -	345
——, tides - - -	510	Brazil mount - - -	83
Bonthe, river Sherbro - - -	331	Breaker islands - - -	499
——, communication - - -	331	Bredos point - - -	68
——, hospitals - - -	331	Bretanha point - - -	95
——, light - - -	331	——, landing - - -	95
——, quarantine regulations -	331	Brimay river - - -	378
——, supplies - - -	331	British consular stations - -	53
——, trade - - -	331	Britten island - - -	464
Booby or Obobi town - - -	452	Briwa rock - - -	408
Boquerao point - - -	153	Broat island - - -	296
Bora Banki island - - -	306	—— river - - -	295
Botof sandhills - - -	122, 126	Brohemia village - - -	453
Bottle rock, Flores island - -	66	Bromham rock - - -	323
Bottomless pit - - -	385	Bronco reef - - -	292
Bourée rock, buoy - - -	108	Brothers trees - - -	434
Brabra Pow hill - - -	410	Broyal or Derrubada point -	240
Braithwait island - - -	239	Bruce point, Lagos river - -	438
Brameya or Dembia river - - -	304	Bruni river - - -	352
—— town - - -	304	—— rock or Whiteman - -	376
—— or Bumia - - -	304	Buba creek - - -	269
Branca island - - -	234	—— river - - -	289
——, current - - -	234	—— town - - -	289
——, depths in channel - -	234	Buchanan town, lower - - -	346
——, tidal streams - - -	234	——, ——, landing - - -	347
——, tides - - -	234	——, middle - - -	346
—— point - - -	81	——, upper - - -	346

Hosted by Google

	Page		Page
Calypso island - - -	289	Canical - - -	150
Camara de Lobos - - -	146	—— point - - -	140
Camarinhas peak - - -	87	Cansado point - - -	202
Cameleon cape - - -	292	Cantarinhas islet, point - - -	68
—— reefs - - -	292	Cantin, cape - - -	119
Camels hump - - -	413	——, current - - -	46
Cameroon cape - - -	532	——, depths off shore - - -	120
—— beacons - - -	533	——, swell - - -	120
—— mountain - - -	526	——, tides - - -	120
——, Little - - -	526	Canto - - -	239
——, river - - -	530	Cape Coast castle - - -	406
——, anchorage - - -	535	——, anchorage - - -	407
——, outer - - -	534	——, communication - - -	407
——, beacons and buoys - - -	532	——, current - - -	49, 422
——, coals and supplies - - -	530	——, hospitals - - -	407
——, communication - - -	530	——, landing - - -	407
——, directions - - -	534	——, light - - -	406
——, patent slip - - -	531	——, signal station - - -	406
——, pilots - - -	531	——, tides - - -	407
——, repairs - - -	531	——, town - - -	406
——, tidal streams - - -	535	—— Palmas, <i>see</i> Palmas, cape - - -	366
——, tides - - -	535	—— shoal, cape Palmas - - -	365
——, trade - - -	531	——, directions - - -	366
——, winds and weather - - -	41	—— shoals, cape Three Points - - -	393
Cameroons, the - - -	22	—— St. Vincent, current - - -	46
——, climate - - -	23	—— Tree - - -	393
——, communication - - -	23	—— Verde islands - - -	31, 227
——, currents - - -	51	——, climate - - -	32
——, flora and fauna - - -	23	——, communication - - -	32
——, population - - -	23	——, currents - - -	51
——, ports - - -	23	——, flora and fauna - - -	32
——, products - - -	23	——, geology - - -	31
——, trade - - -	23	——, haze - - -	44
Camisa point - - -	173	——, population - - -	32
Campanario village - - -	146	——, ports - - -	32
Campbell peninsula - - -	312	——, rollers - - -	44
—— point - - -	460	——, trade - - -	32
Canary islands - - -	29, 160	——, winds - - -	44
——, barometer - - -	40	Capellas village - - -	95
——, climate - - -	31	Capellinha rock - - -	71
——, communication - - -	31	—— light, fog signal - - -	71
——, fisheries - - -	30	Cappstown - - -	461
——, flora and fauna - - -	30	Caramujo hill - - -	233
——, geology - - -	29	Carapacho point - - -	79
——, general directions - - -	160	Carboeiros bay - - -	228
——, population - - -	30	Carcavellos cove - - -	233
——, ports - - -	31	Carlotta fort, light - - -	248
——, products - - -	30	Carneiros islet - - -	85
——, trade - - -	30	—— point - - -	85
——, volcanic eruption - - -	29	Carneyros, port - - -	91
——, winds and weather - - -	48	Carpenter rock, Sesters point - - -	362
Candelaria point - - -	87	——, Sierra Leone - - -	323
—— village - - -	76	Casa Blanca, <i>see</i> Dar-el-Beida - - -	116

	Page		Page
Casa point - - -	65	Chama bay dispensary - -	401
Casset river - - -	294	----- fort - -	401
Cassini river - - -	294	Channel breakers, Old Calabar -	517
Castanheira, port, landing -	153	Chanomi creek - - -	455, 459
Castanho peak - - -	151	-----, directions - -	459
Castellito point - - -	76	Chao island - - -	152
Castellitos point, landing -	79	-----, landing - -	153
Castello point, Madeira island -	151	Chapman rock - - -	70
-----, Santa Maria island -	97	Christiansborg castle - -	415
----- Branco point - -	70	Church mount - - -	388
Castle rock - - -	361	Cima island - - -	155
Catherina bay - - -	282	-----, Rombos islets - -	249
Cavalho island - - -	291	Cindadela - - -	166
----- spit - - -	291	Cintra hills - - -	198
Cavally Half - - -	370	Climate, Akwayafe river - -	21
----- ledge - - -	370	-----, Amba bay - -	23
----- point - - -	370	-----, Azores - - -	25
-----, anchorage - -	371	-----, Banana islands - -	11
-----, landing - -	371	-----, Bijouga islands - -	8
----- river - - -	370	-----, Bissao - - -	8
-----, winds and weather -	39	-----, Bulama - - -	8
----- rock - - -	370	-----, Calabar, Old - -	21
Cawthorne channel (False Calabar)-	508	-----, Cameroon river - -	23
-----, buoys - - -	508	-----, Canary islands - -	31
-----, directions -	508, 509	-----, Cape Verde islands -	32
-----, pier - - -	508	-----, Cassini river - -	10
Caxorro, porto - - -	76	-----, French Sudan - -	9
Cayar village - - -	215	-----, Gambia river - -	7
-----, landing - -	215	-----, Bathurst - -	7
Cayo bank - - -	282	-----, Gold Coast - -	16
----- channel - - -	281	-----, Ibadan - - -	18
-----, directions - -	283	-----, Isles do Los - -	11
----- islands - - -	280	-----, Juby, cape - -	4
----- point - - -	280	-----, Lagos - - -	18
Cayofeto hill - - -	172	-----, Liberia - - -	13
Cedres point - - -	97	-----, Madeira - - -	28
Cedros point - - -	71	-----, Marocco - - -	3
Centre hill, Factory island -	312	-----, Mogador - - -	3
Cerro Martiño, Lobos island, light -	184	-----, Monrovia - - -	13
Cestos bay - - -	350	-----, Niger - - -	19
-----, anchorage - -	350	-----, Nunez river - -	8
-----, directions - -	351	-----, Opobo river - -	21
-----, tides - - -	351	-----, Porto Grande - -	33
----- point - - -	350	-----, San Miguel - -	26
----- reef - - -	350	-----, Senegal and Senegambia -	6
----- river - - -	350	-----, Sherbro river - -	12
-----, bar - - -	350	-----, Sierra Leone - -	11
-----, rock - - -	350	-----, Tangier - - -	3
Chama Bay or Eshama - -	401	-----, Togoland - -	16
----- anchorage - -	402	Climin town - - -	130
----- communication -	401	Coal supply, general - -	53
----- dangers - - -	402	-----, Akassa, river Niger -	470
		-----, Bathurst - -	258

	Page		Page
Coal supply, Bonny - - -	503	Congo rock, buoy - - -	367
-----, Cameroon river -	530	Cousado, Porto - - -	133
-----, Dakar - - -	220	Consuelo point, beacon -	205
-----, Freetown, Sierra Leone	324	Contango creek - - -	265
-----, Funchal - - -	142	Contiendas point - - -	83
-----, Horta, Fayal - - -	72	-----, landing - - -	83
-----, Konakri - - -	311	Cooks loaf - - -	414
-----, Lagos - - -	439	Cooper point - - -	308
-----, La Luz harbour - -	175	----- rock - - -	308, 322
-----, Mogador - - -	123	Coppera island - - -	305
-----, Nunez river - - -	296	Coral reef - - -	241
-----, Ponta Delgada - -	88	----- island - - -	309
-----, Port Naos - - -	188	Corona, monte - - -	186
-----, Porto Grande - -	230	Cortado point - - -	151
-----, Praya, St. Jago -	246	Corveiro cape - - -	200
-----, Praya, Terceira -	82	Corvo island - - -	64
-----, Santa Cruz, Tenerife	166	-----, anchorage - -	66
-----, Sierra Leone - -	324	-----, currents - - -	69
-----, St. Louis, Senegal	212	-----, depths off shore	65
-----, Tangier - - -	107	-----, tidal streams -	69
Coast Castle, cape - - -	406	-----, tides - - -	69
Cobo state - - -	9	Costa river - - -	386
Cockboro river - - -	329	-----, depth on bar -	386
Cockcomb hillock - - -	344	Côte de Barbarie - - -	210
Coimbra bank - - -	275	Craig creek - - -	459
Coley rock - - -	365	Crawford creek - - -	463
-----, current - - -	366	----- or Ruma island -	308
Colonia point - - -	285	----- shoals - - -	308
Colorado cape - - -	181	Creek point - - -	306
Communication, Azores - -	25	----- town - - -	517
-----, Canary island -	31	Creoulo hills - - -	233
-----, Cape Verde islands	32	Crevecoeur, fort - - -	415
-----, French Sudan - -	9	Cristianos, port - - -	172
-----, Gambia - - -	7	Croft creek - - -	464
-----, Gold Coast - - -	15	Cross river - - -	522
-----, Lagos - - -	18	-----, depths - - -	522
-----, Liberia - - -	13	Crown hillock - - -	344
-----, Madeira - - -	28	Cruces island - - -	187
-----, Marocco - - -	2	Cruz, Ilheo da - - -	151
-----, Niger - - -	21	----- point - - -	140
-----, Portuguese Guinea	8	Cumplida point - - -	161
-----, Senegal and Sene-		-----, light - - -	161
-----, gambia - - -	6	Cunral, Madeira - - -	137
-----, Sierra Leone -	11	----- Velho point - -	241
-----, Togoland - - -	17	Curralinho island - -	241
Componi river - - -	295	Currehts, general observations	45
-----, tides - - -	295	-----, Agadir or Sta. Cruz	47
----- shoals - - -	294	-----, Arguin bank - -	47
Comprida point - - -	71	-----, Azores islands -	51
Conception bank - - -	191	-----, Badagri to Lagos river	438
Confital bay - - -	173	-----, Benin river - -	452
----- point - - -	173	-----, Bight of Benin -	50
Conflict reef - - -	294	-----, Blanco, cape - -	46

	Page		Page
Currents, Bojador, cape	46, 47	Dahomey, French colony of, commu-	17
-----, Bonavista island	51	-----, ports	17
-----, Branca island	234	-----, trade	17
-----, Canary islands	51	-----, winds	37
-----, Cantin, cape	46	Daisy bank	463
-----, Cape Coast Castle	49	Dagana	210
----- to		Dakar	219
Whyda	422	-----, anchorage	221
-----, Cape Formosa to Old		-----, coal and supplies	220
Calabar	50	-----, communication	220
-----, Cape Verde islands	51	-----, hospital	218, 221
----- to Sierra		-----, lights	220
Leone	48	-----, moles	221
-----, Corveiro, cape	47	-----, mooring buoys	221
-----, Elmina	406	-----, point	219
-----, Equatorial	51	-----, repairs	220
-----, Fogo island	249	-----, submarine telegraph cable	220
-----, Forcados river	465	-----, town	219
-----, Gorée bay	48	Dalrymple bay, anchorage	287
-----, Gran Canaria islands	51	Damadosa wood	379
-----, Guinea	48	Damiong bay, anchorage	290
-----, Inshore currents	46, 47, 49	Dampa hill (Cooks loaf)	414
-----, Juby, cape	47	Dan or Cooper point	308
-----, Little Popo	433	Dano village	431
-----, Manuel, cape	48	-----, communication	431
-----, Mayo island	51	Dapecará island	296
-----, Mogador	46	-----, reefs off	297
----- to cape Bojador	46	Dar-el-Beida or Casa Blanca, cape	115
-----, Palmas, cape	49	-----, anchorage	117
-----, Pongo river	304	-----, communication	116
-----, Portugal	45	-----, landing	116
-----, St. Antonio	51	-----, light	116
-----, St. Jago island	247	-----, quarantine	116
-----, St. Vincent island	51	-----, supplies	116
-----, Sal island	51	-----, town	116
-----, Salvage islands	51	-----, trade	116
-----, Senegal	48	Daresalama creek	264
-----, Sierra Leone to cape		Davey or Ologi creek	454
Palmas	49	Dead islet	360
-----, Three Points, cape	49	Deadman island	500
-----, Verde, cape	49	----- point	500
-----, Wadi Shibika	47	Debreeka river	305
-----, Whyda to cape Coast	422	----- depth	306
		----- directions	306
		----- supplies	306
		----- tides	306
		Debundga point	525
		Deception cliff	194
		Deer islands	264
		Degama creek	499
		-----, anchorage	510
		-----, factories	499
D.			
Dabu	387		
Dacia bank	159		
Dahomey, French colony of	16		
-----, climate	17		

D.

	Page		Page
Eastern spit, Opobo river	514	English road, Bonavista island	240
Ebomesu river	389	————, —————, anchorage	241
Ebute Metta	439	————, —————, directions	241
Edgecombe mount	407	————, —————, light	240
Edina settlement	346	————, —————, tides	241
———— tides	348	————, Mayo island	243
Edmonstone island	337	————, —————, anchorage	243
Egbag	486	————, —————, landing	244
Egbini	454	————, —————, light	243
Egbom	485	Ensu point	378
Egga, river Niger	485	Entroza river	150
Egoru	454	Epeh	443
Ehi lagoon	388	Eper rivulet	408
Ekau	474	Equatorial current	51
Ekole	474	Erece bay, anchorage	163
———— creek	497	Errick	342
Eko or Lagos island	436	Escolar or Sunk rock	67
El Araújo	111	Escravos river	455
————, anchorage	112	————, tides	456
————, bar	111	Esene factory	512
————, communication	111	Esereus or Baddu river	360
————, landing	111	Eshama or Chama fort	401
————, quarantine	112	Eso or Zunu river	437
————, supplies	111	Espalamaca point	70
————, tides	112	Espartal point	85
————, trade	112	Espartel point	75
El Becerro	174	Ethiope rapids	522
— Golfo	164	———— river	449
— Nido or Sphinx head	174	————, navigability	450
— Rincon	192	Etsin river	409
— Roqué islet, Garachico	171	Europa point	109
————, Isleta	174	Ewiano or Half Assini	388
— Waladieh ruins	120		
Elbow point	194		
Elder creek	460		
Elephant island	263		
Elinkim river	271		
Eliza island	489		
Elmina bay	404		
————, anchorage	405		
————, castle	404		
————, coals and supplies	405		
————, communication	405		
————, current	406		
————, landing	405		
————, tides	406		
————, Chica	430		
————, landing	431		
————, point	404		
Enframa point	379		
Engenni river	498		
English bay	323		
———— reef	241		

F.

Factory island, Grand Sesters river	362
————, anchorage	363
————, Isles do Los	308
———— point	468
Fagan island	461
Faja da Ovelha point	147
Fajodj or Fadjudj river	225
Fajao d'Agua	249
Falcon point	332
———— rock	157
False cape Blanco	200
————, Bojador cape	136
————, landing	136
————, Sierra Leone	327

	Page		Page
False entrance, Middleton river	- 467	Fisherman point	- 197
—— Kwoibo river	- 515	Fish town beach, Sinu river	- 355
Falulo breakers	- 275, 276	——, Benin river	- 453
Famara monte	- 186	—— creek, Brass river	- 495
Fambine bank	- 253	——, Liberia	- 346
Fanaes point	- 68	——, Old Calabar river	- 522
Fanaïs point, Graciosa	- 80	—— point, cape Palmas	- 365
——, St. Miguel	- 95	——, Sinu river	- 355
Fandrobega or Upper Fishtown		—— reef	- 365
creek	- 496	Flagstaff hill	- 243
Fanin village	- 308	Flat island	- 359
Farafinya creek	- 269	——, caution	- 359
Farim, river Cacheo	- 279	——, rock	- 359
Farion point	- 186	—— mountain	- 368
Faro river	- 489	Flores island	- 66
Farran point	- 326	——, currents	- 69
Farringhia village	- 303	——, depths off shore	- 69
Fatik town	- 253	——, tidal streams	- 69
Fayal channel	- 70	——, tides	- 69
—— island	- 69	Foa	- 421
——, depths off shore	- 76	Fogo bay, landing	- 81
——, description	- 69	—— island	- 248
——, tidal streams	- 74	——, anchorage	- 248
——, tides	- 74	——, currents	- 249
—— islet	- 151	——, landing	- 248
—— point, Madeira island	- 151	——, light	- 248
——, San Miguel island	- 93	——, supplies	- 248
—— river	- 151	——, tides	- 249
—— town	- 151	—— peak	- 130
Fedala, cape	- 115	—— point	- 81
——, anchorage	- 115	—— village	- 81
——, banks	- 115	Fogue	- 478
——, depths, off shore	- 115	Fonte island	- 156
—— village	- 115	—— point	- 156
Feiteira point	- 97	Fontes Pereira de Mello	- 228
Feiteiras cove	- 70	Fonti village	- 127
Fellane river	- 251	Fora islet	- 138
Félou falls	- 210	—— caution	- 138
Fen river	- 349	—— depths off shore	- 139
—— rocks	- 349	——, light	- 138
Ferraria point	- 87	——, storm signals	- 138
——, signal station	- 87	Forca point	- 92
Ferreira point	- 80	Forcados flats	- 473
Ferro island, Porto Santo island	- 156	—— river	- 456
—— <i>see</i> Hierro island	- 163	——, anchorage	- 459
Feruwa river	- 361	——, bar	- 457
Fetta bay	- 413	——, buoys	- 458
—— country	- 414	——, communication	- 457
—— point	- 413	——, currents	- 465
——, landing	- 414	——, depths off shore	- 465
——, supplies	- 413	——, directions	- 458, 464
——, village	- 413	——, least depth	- 457
Fisherman lake	- 342	——, pilots	- 458

	Page		Page
Forcados river, tidal stream - - -	459	French Sudan, ports - - -	9
-----, tidal streams - - -	458	-----, trade - - -	9
-----, tides - - -	458	Fresco - - -	382
-----, to Benin river and		-----, anchorage - - -	383
Sapele, through Chanomi and		Freshwater bay - - -	235
Nanna creek - - -	459	Fuencaliente point - - -	161
Forester bank - - -	269	-----, light - - -	161
Forikiaria river - - -	315	Fuera rock - - -	165
-----, directions - - -	315	Fuerteventura island - - -	182
-----, least depth - - -	315	-----, anchorage - - -	185
-----, tides - - -	316	-----, current - - -	183
Fork, the, Nanna creek - - -	460	-----, depths off	
Formigas bank - - -	100	shore - - -	183
-----, nature of bottom - - -	101	-----, lights - - -	182, 183
-----, reported dangers - - -	102	Fumbina range, Benue river - - -	439
----- rocks - - -	100	Funchal anchorage - - -	144
-----, landing - - -	101	----- bay - - -	141
-----, soundings - - -	101	----- city - - -	141
Formosa bank - - -	283	----- coal and supplies - - -	142
----- island - - -	283	----- coal signals - - -	143
----- monte - - -	235	----- communication - - -	142
----- point - - -	94	----- depths off shore - - -	144
Formoso cape - - -	491	----- directions - - -	145
-----, tides - - -	491	----- hospital - - -	143
Fort de Lagoa - - -	72	----- landing - - -	143
----- do Santo, light - - -	80	----- light - - -	141
----- Douglas - - -	452	----- mountain streams - - -	144
Fort James, Gambia river - - -	265	----- prohibited anchorage - - -	145
Forte da Area - - -	92	----- quarantine - - -	143
----- island - - -	81	----- repairs - - -	143
Fouché channel - - -	506	----- storm signals - - -	141
-----, directions - - -	507	----- storms - - -	42
----- creek - - -	499	----- tidal streams - - -	146
----- patches - - -	502	----- tides - - -	146
----- point - - -	499	Fundiun - - -	253
----- West channel - - -	506	----- anchorage - - -	254
----- depths - - -	506	----- communication - - -	254
Foul channel - - -	233	----- tides - - -	254
----- point - - -	243	Furado point, Maderia island - - -	139
Fozo do Porto point - - -	81	-----, Porto Santo island - - -	156
Frades point, Santa Maria island - - -	98	Furna cove - - -	249
-----, landing - - -	98	Fustes cove - - -	185
Francés island - - -	187	Futabar or Tamara island - - -	307
Fraylecito point - - -	104		
Frayles rocks - - -	83		
Fredensborg fort - - -	419		
Frederick point - - -	392		
Freetown, <i>see</i> Sierra Leone - - -	324		
French Sudan - - -	8		
-----, climate - - -	9		
-----, communication - - -	9		
-----, flora and fauna - - -	9		
-----, population - - -	9		

G.

Gabasera rocks - - -	162
Gaboon, telegraph - - -	21
Gadella islet - - -	68
Gadomi or Jackin - - -	435
-----, shoal - - -	435

	Page		Page
Gaivolas point - - -	140	Gando bay - - -	179
Galder bay - - -	173	----- landing - - -	180
----- mount - - -	173	----- point - - -	179
----- town - - -	173	----- light - - -	179
Galera point - - -	92	----- port - - -	179
-----, Maderia - - -	147	----- reef - - -	179
Galha Pedra de, rock - - -	199	Gapeh river - - -	380
----- point - - -	199	Garachico anchorage - - -	171
Galhao or North reef - - -	243	----- town - - -	171
Galiana rock - - -	150	Garajao cape or Brazen head - - -	140
Gallinas river - - -	341	----- depths - - -	
-----, anchorage - - -	341	----- off shore - - -	141
-----, bank - - -	341	Garamas island - - -	280
-----, bar - - -	341	----- spit - - -	275, 278
-----, landing - - -	341	Garça point - - -	92
-----, tides - - -	341	Garizim - - -	129
Gallinha island - - -	288	Garnet bay - - -	193
Gallwey creek - - -	462	----- anchorage - - -	193
Gambi river - - -	273	----- head - - -	193
Gambia colony - - -	7	Garraway point - - -	363
-----, climate - - -	7	----- rocks - - -	363
-----, communication - - -	7	----- or Tryh river - - -	363
-----, population - - -	7	----- tree - - -	363
-----, products - - -	7	Garua, Benue river - - -	490
-----, tornadoes - - -	37	Gaviota point - - -	162
-----, trade - - -	7	Gazelles island - - -	211
----- river - - -	251	George island, Middleton river - - -	467
-----, anchorage, outer - - -	258	Germano island - - -	255
-----, buoys - - -	256, 257	Ghir cape or Ras Aferni - - -	127
-----, Bathurst - - -	258	Giba or Paka island - - -	391
-----, anchorage - - -	259	Gilli-Gilli village - - -	454
-----, buoy - - -	259	Gilmorris island - - -	335
-----, coals - - -	258	Ginamar point - - -	179
-----, communica- tion - - -	258	Ginate point - - -	189
-----, hospital - - -	259	Ginoi point - - -	269
-----, lights - - -	259	Giraffe tree - - -	435
-----, piers - - -	259	Girao, cape - - -	147
-----, supplies - - -	258	Gloria-Ibo - - -	483
-----, dangers - - -	256	Goat (Cabras) islands - - -	83
-----, depths off shore - - -	256	Gokhor creek - - -	253
-----, directions - - -	259	Gold Coast Colony - - -	14
-----, navigability - - -	251	-----, climate - - -	16
-----, pilots - - -	259	-----, communication - - -	15
-----, tides 261, 262, 263, 265, 266		-----, flora and fauna - - -	14
Gamma town - - -	411	-----, geology - - -	14
Gancho banks - - -	285	-----, population - - -	15
Ganagana - - -	457	-----, ports - - -	15
-----, hulk - - -	459	-----, produce - - -	15
-----, directions, from Gos- hawk point - - -	463	----- hill - - -	403
-----, directions, from Wari - - -	463	Goldie creek - - -	464
Gandiole telegraph station - - -	214	----- fort - - -	486
		-----, communication - - -	486
		Gomaluta or Porto Seguro - - -	432

	Page		Page
Gomba - - - - -	476	Grand Bassa, landing - - -	347
Gombaru point - - -	223	----- point - - -	348
Gomera island - - -	162	-----, tides - - -	348
-----, anchorages - -	163	-----, wreck - - -	347
-----, depths off shore -	163	----- Bassam - - -	385
-----, tides - - -	163	-----, anchorage - -	386
-----, port - - -	163	-----, bar - - -	386
Gomez bay - - -	81	-----, communication -	386
-----, landing - - -	81	-----, lagoon - - -	387
----- point - - -	81	-----, wreck - - -	386
-----, landing - - -	81	----- Berebi - - -	375
Gonsalez flats - - -	295	-----, anchorage - -	376
----- island - - -	295	-----, communication -	376
Gorda point, Fuerteventura island -	182	-----, landing - - -	376
-----, Santa Maria island -	97	-----, supplies - - -	376
Gord-el-Jamar hill - - -	133	-----, tides - - -	376
Gordo, monte - - -	234	----- Butu - - -	354
Gorée bay - - -	217	----- point - - -	354
----- light - - -	218	----- river - - -	354
----- island - - -	218	----- Drewin - - -	330
-----, caution - - -	218	----- Kulloh river - -	349
-----, supplies - - -	218	----- Lahu river - - -	383
-----, tides - - -	219	-----, anchorage - -	383
----- road - - -	218	-----, communication -	383
-----, anchorage - - -	218	-----, tides - - -	384
-----, tornadoes - - -	219	-----, village - - -	383
Gorgulho, Ilheo do - - -	146	----- Sesters river - -	362
Goru point - - -	301	----- Tabu - - -	373
Goshawk point - - -	457	-----, anchorage - -	373
-----, directions to Gana-		----- town, cape Palmas -	356
----- gana - - -	464	Grande cove - - -	233
----- Wari - - -	462	----- island - - -	240
Graciosa island, Azores - - -	79	-----, Porto, <i>see</i> Porto Grande -	230
----- anchorage - - -	80	Gré rapids - - -	371
----- communica-		Great Akwa river - - -	518
----- tion - - -	79	Great Canary or Gran Canaria	
----- depths off		island - - -	172
----- shore - - -	81	----- Nanna Kru - - -	358
----- landing - - -	81	----- Nifu - - -	359
----- light - - -	80	----- Piton island - - -	159
----- supplies - - -	79	----- Popo - - -	433
----- tides - - -	81	----- Poro village - - -	378
----- island, Canary islands -	180	----- Salvage island - -	158
Gran Canaria or Great Canary		-----, anchorage - -	158
island - - -	172	-----, caution - - -	158
-----, coal - - -	175	-----, directions - -	158
-----, currents - - -	51	-----, landing - - -	158
-----, depths off shore -	181	----- Skarcies river - -	320
-----, winds - - -	43	-----, tides - - -	321
Grand Basha river - - -	373	Great Tree hills - - -	409
----- Bassa - - -	346	----- Wappi point - - -	359
-----, anchorage - - -	347	----- village - - -	359
-----, communication - -	347	Green islet - - -	364

	Page		Page
Horta bay, light	72	Isles do Los, north channel	309
———, quarantine	73	———, remarks	307
———, repairs	73	———, south channel	309
———, signal station	73	———, tidal streams	310
———, supplies	73	———, tides	310
———, tidal streams	74	Islet reef, Dix cove	396
———, tides	74	Isleta peninsula	173
———, town	72	———, light	173
———, trade	73	———, pilots	174
Hoya La, bay	170	———, signal station	174
Hulk rock	525	Iteatoholu or Monkey island	496
Hundsköpfe shoals	532	Itu river	272
Hutchinson island	336	——, Cross river	522
Hyenne or Yen village	223	Ivory town or Afugu	384
		Ivy bank, buoy	462

I.

Ibi, Benue river	488
Ida, river Niger	484
——, anchorage	484
——, dangers	484
——, town	484
Idantenan heights	127
Iddo island	439
Idu town	476
Idufker village	129
Ifni, wadi	129
Igbaku	483
Igua town	406
Ikegu, village	445
Ikinetu creek	522
Ikoradu bay	443
Ikorofiong (Jericoek)	522
Ikutta, lake	476
Île de Babagué	213
Île du Diable	303
Ilha, ponta da	75
Ilheo de Gorgulho	146
——— Mulha	65
Ilheos point	67
Illah	484
Illushi	484
Imuma village	410
Inferno or West rock	190
Inglis Pahboyee river	319
Inner reef, English road	241
Iron mountains or Jebel Hadid	122
Isaac point	350
Isabang	522
Isles do Los (Idolos)	307-310
———, local magnetic disturbance	307

J.

Jackin or Gadomi	435
Jack-Jack	384
Jacksona point	255
Jakna	444
Jakubel river	273
Jalunga point, light	249
Jamaica point	333
——— village	332
Jamber group	291
——— island	291
——— pass	291
James flats, Old Calabar	518
——— island	518
——— point	372
——— town fort, Accra	414
———, light	414
———, Old Calabar	517
Jamieson river	449
——— navigability	450
Jandia peninsula	182
——— point	183
———, light	183
———, shoal	183
Janekunda creek	262
Janella, rio	228
——— rocks	149
Jardim point	147
Jarin creek	263
——— point	268
Jarreng creek	264
Jatia river	305
——— town	305

	Page
Jatt channel - - -	280
— shoals - - -	280
Jeba channel - - -	281
— river - - -	280
Jebba - - -	486
— communication - - -	486
— rapids - - -	477
Jebel Ilabib mountain - - -	110
— Hadid or iron mountains - - -	122
— Sarsar mountain - - -	112
Jella Koffi or Jellu-kofi - - -	429
—, anchorage - - -	429
—, landing - - -	429
—, supplies - - -	429
Jenkins channel - - -	333
— village - - -	332
Jeremias anchorage - - -	109
—, directions - - -	110
Jericoek or Ikorofiong - - -	522
Jews cliff or Sharf-el-Yahudi - - -	121
Jida river - - -	364
Jien creek - - -	265
Jifandur island - - -	255
Jili point - - -	301
Jillifri, water, Gambia river - - -	258
Jinak creek - - -	255
Joal flat - - -	225
— patches - - -	225
— village - - -	225
João Bom bay - - -	95
— Dias point - - -	70
— S. point - - -	75
Joba creek - - -	265
Joe town - - -	460
Join Tree, cape Formoso - - -	493
Joliba river - - -	476
Jones creek - - -	460
Jong river - - -	331
Joque island - - -	271
—, pilots - - -	272
Jorba or Sok Ensara - - -	129
Jorge point - - -	71
—, San, island - - -	77
Juan Fernandez mount - - -	239
— Graie point - - -	162
— Lopez, anchorage - - -	171
Juby, cape - - -	134
—, anchorage - - -	135
—, climate - - -	8
—, communication - - -	134
—, current - - -	47
—, directions - - -	135
—, landing - - -	135

	Page
Juby, cape, light - - -	134
—, tides - - -	135
—, trade - - -	135
—, water - - -	135
Judios bay - - -	105
— point - - -	104
— rivulet - - -	105
Jufung breakers - - -	275
— point - - -	274
Ju-ju point - - -	500
Jumbas bank - - -	255
— river - - -	255
—, tidal stream - - -	255
Jum island - - -	255
Junk river - - -	345
—, anchorage - - -	345
—, tides - - -	345
Jurong creek, Gambia river - - -	266
—, tidal streams - - -	268
—, tides - - -	266
Jurunka creek - - -	265

K.

Kabla hill - - -	365
Kábláke village, Cavally river - - -	370
—, Tabu river - - -	372
Kachiuane river - - -	271
Kadabu bluff - - -	375
Kafuta or Faraba creek - - -	261
Kadrokoa village - - -	381
Ka Hai islands - - -	267
Kahone village - - -	254
Kajamang creek - - -	269
Kajinolle river - - -	273
Kakraba or Small hills - - -	383
Kakich village - - -	294
Kakouka island - - -	320
Kakulima mount - - -	305
Kakunzu island - - -	304
— reef - - -	304
Kaku river - - -	413
Kalaba or Oione (Old Calabar) river - - -	516
Kamaranka river - - -	329
Kamasun island - - -	341
Kanabak island - - -	290
—, reach - - -	290
Kansala, Vintang creek - - -	261
—, anchorage - - -	261
—, pier - - -	261
—, supplies - - -	261
—, tides - - -	262
Kaolack - - -	254

	Page		Page
Kaolack anchorage - - -	254	Kesey rock - - -	477
— supplies - - -	254	Khos, wadi el - - -	111
— tides - - -	254	—, bar - - -	111
Kappatches river - - -	299	Kichom - - -	320
Karabane island - - -	271	Kid island - - -	308
—, anchorage - - -	272	Kieh - - -	527
—, light - - -	271	Kila shoal - - -	336
Karantaba creek - - -	269	— village - - -	336
Karashe bank - - -	282	King Amachri's town - - -	502
— island - - -	280	— George town - - -	380
Kasamanze, Grand bank - - -	271	— Tom's point - - -	324
— river - - -	271	— William town, Nicoll island - - -	529
—, anchorage - - -	272	—, anchorage - - -	529
—, bar - - -	272	— Wills bay - - -	358
—, beacon - - -	272	— point - - -	358
—, buoy - - -	272	— town - - -	358
—, light - - -	271	Kiong Manila creek - - -	262
—, pilots - - -	272	Kitchoru point - - -	411
—, tidal streams - - -	274	Kitta - - -	430
—, tides - - -	273	—, anchorage - - -	430
—, trade - - -	273	—, caution - - -	430
—, winds and weather - - -	37	—, communication - - -	430
Kasasi village - - -	298	—, depths off shore - - -	430
Kashan creek - - -	268	—, hospital - - -	430
— point - - -	266	—, supplies - - -	430
Kassagua river - - -	295	Kodiobuë lagoon - - -	387
Kassakobuli - - -	298	Kolei'at village - - -	127
Kassang hill - - -	267	Kommenda point - - -	403
Kassi point - - -	379	Komoë or Akba river - - -	387
— reefs - - -	403	Konakri, Tumbo island - - -	310
Kasso village - - -	308	—, anchorages - - -	311
Kaswar town - - -	454	—, buoys - - -	311
Katak island - - -	294	—, caution - - -	312
Katie, mount - - -	490	—, coal and supplies - - -	311
Katon bay - - -	275	—, communication - - -	311
Katsena-Allah - - -	487	—, directions - - -	312
—, river - - -	487	—, pilots - - -	311
Katu point - - -	361	—, telegraph cable - - -	311
— rocks - - -	361	—, tidal streams - - -	312
— town - - -	361	—, tides - - -	312
Katum rock - - -	375	—, trade - - -	311
Kaua creek - - -	266	Konebombi bank - - -	305
— hill - - -	266	— island - - -	304
Kbëgo river - - -	379	Kong - - -	13
Kebbi river - - -	490	—, climate - - -	14
Kebrada point - - -	391	—, communication - - -	13
Kelere road - - -	214	—, flora and fauna - - -	13
— village - - -	215	—, geology - - -	13
Kellett island - - -	283	—, mountains - - -	476, 479
Kennedy island, Volta river - - -	420	—, ports - - -	13
Kent town - - -	327	—, trade - - -	13
Keoba rock - - -	354	Kongesteen fort, Volta river - - -	421
Kesamu town - - -	436	Kormantan fort - - -	409

	Page		Page
Kormantan, hills - - -	410	Kwoibo river, False - -	515
—————, landing - - -	409	—————, tides - - -	516
—————, town - - -	409		
Kortimo island - - -	320	L.	
Kotobrai cliffs - - -	402	L'Agaete valley - - -	181
Kotoko river - - -	411	Labadi, shoal - - -	417
Kotonu or Appi - - -	435	———— village - - -	417
—————, anchorage - - -	435	Lafun river - - -	486
—————, communication - - -	435	Lagens lagoon - - -	75
—————, depths off shore - - -	435	———— point - - -	67
—————, light - - -	435	———— village - - -	67
—————, pier - - -	435	Lagoa do Fogo - - -	92
—————, submarine telegraph		———— Grande - - -	86
cables - - -	435	Lagoba gap - - -	225
—————, supplies - - -	435	Lagoinhas islet - - -	98
Krabbe point - - -	235	Lagos colony - - -	17
Kradu water - - -	443	—————, climate - - -	18
Kra Kra creek - - -	509	—————, communication - - -	18
Kriekena, Sombbrero river	498	—————, population - - -	17
Krobo hills - - -	419	—————, products - - -	17
Kru bay - - -	322	—————, trade - - -	18
——, country - - -	353	———— creek - - -	453
——, communication - - -	354	———— lagoon - - -	443
——, Great Nanna - - -	358	———— light - - -	439
——, Little - - -	356	—— or Eko island - - -	438
——, rock - - -	356	—— river, anchorage, outer	440
——, Settra - - -	357	————, bar - - -	440
Kruba - - -	357	—————, signals - - -	442
Krule point - - -	263	—————, beacon - - -	441
Kuati village - - -	380	—————, boat entrance - - -	442
Kudang creek - - -	264	—————, buoys - - -	441
———— village - - -	264	—————, depths off shore - - -	443
Kuduna river - - -	486	—————, directions - - -	442
—————, level of the river	479	—————, greatest draught - - -	441
Kulloh, Grand, river - - -	349	—————, rollers - - -	440
—————, village - - -	349	—————, rules - - -	442
——, Little or Kurrau river	348	—————, signals - - -	440
—————, rocks - - -	349	—————, submarine telegraph	
Kumasi - - -	402	cable - - -	440
Kumbrini rock - - -	396	—————, tidal streams - - -	443
Kuntamkweri village - - -	410	—————, tides - - -	443
Kuramo island - - -	445	—————, sanitarium - - -	439
Kurrau or Little Kulloh river	348	———— town - - -	439
Kutru - - -	382	—————, anchorage - - -	442
Kuzu river - - -	352	—————, coal and supplies - - -	439
Kwa mountain - - -	526	—————, communication - - -	439
Kwaben hill - - -	410	—————, hospital - - -	440
Kwakwa river - - -	530	—————, quarantine - - -	443
Kwarra point - - -	464	—————, repairs - - -	440
Kveraima, wadi - - -	129	—————, trade - - -	444
Kwoibo river - - -	515		
—————, bar, depths on	515		
—————, factories - - -	515		

	Page		Page
La Hoya bay - - - -	170	Levricr - - - -	201
Lahu, Grand river - - -	383	— tides - - - -	204
—, Half - - - -	383	Liaba - - - -	478
—, mount - - - -	384	Liberia - - - -	12
Lake villages - - - -	389	—, climate - - - -	13
Lalor point - - - -	461	—, communication - - -	13
La Luz harbour - - - -	174	—, flora and fauna - - -	12
—, anchorage - - - -	177	—, geology - - - -	12
—, buoys - - - -	178	—, population - - - -	12
—, coal and supplies - -	175	—, ports - - - -	13
—, communication - - -	175	—, products - - - -	12
—, dangers - - - -	175	—, trade - - - -	12
—, directions - - - -	178	Light, Accra - - - -	414
—, hospitals - - - -	176	—, Almadi point - - - -	215
—, lights - - - -	175	—, Angra, San Antonio - -	83
—, patent slips - - - -	176	—, Areynaga point, Gran Ca-	
—, pilotage - - - -	176	naria - - - -	180
—, quarantine regulations	176	—, Arnel point, St. Michael	
—, repairs - - - -	176	island - - - -	93
—, telegraph cable - - -	177	—, Ballena point, Fuerteventura	
—, tides - - - -	178	island - - - -	182
—, trade - - - -	177	—, Bathurst - - - -	259
Lamin creek - - - -	261	—, Brava island - - - -	249
— point - - - -	265	—, Bull point, St. Antonio -	228
Landing, Marocco. See Open ports	104	—, Capellinha point, Fayal -	71
Langdon mount - - - -	381	—, Carlotta fort, Fogo island -	248
Lantailla point - - - -	185	—, Cerro Martino - - - -	184
Lanzarote island - - - -	185	—, Coast Castle, Cape - - -	406
Lapa island - - - -	146	—, Cumplida point, Palma is-	
Laranjeira shoal - - - -	69	land - - - -	161
Las Bajas or North rocks - -	174	—, Dakar - - - -	218, 220
Las Nieves - - - -	181	—, Dar el Beida - - - -	116
Las Palmas - - - -	174, 178	—, Delgada point, Allegranza	
—, communication - - -	178	island - - - -	190
—, landing - - - -	178	—, English road, Bonavista -	240
—, light - - - -	178	—, Mayo - - - -	243
—, supplies - - - -	178	—, Fogo island - - - -	248
— Silletas - - - -	174	—, Fora islet, Madeira - - -	138
— Tintoreras - - - -	174	—, Fuencaiente point, Palma	
Lau - - - -	489	island - - - -	161
La Vaca shoal - - - -	174	—, Funchal bay, Madeira - -	141
Lavati point - - - -	525	—, Gando point, Gran Canary -	179
Lecky islets - - - -	461	—, Horta Fayal - - - -	72
— reef - - - -	159	—, Isleta peninsula, Gran Canaria	173
Lekki lagoon - - - -	445	—, Jalunga point, Brava island -	249
—, town - - - -	445	—, Jandia point, Fuerteventura	
—, vista - - - -	445	island - - - -	183
Lemo, Morro de - - - -	78	—, Juby, cape - - - -	134
Leon, or Porto, islet - - -	233	—, Karabane, Kasamanze river -	271
Leton rock - - - -	242	—, Lagos - - - -	439
—, soundings - - - -	242	—, La Luz harbour - - - -	175
Leven head, anchorage - - -	193	—, Las Palmas - - - -	178
Levrier bank - - - -	202	—, Loo rock, Madeira - - - -	141

	Page		Page
Light, Malmorendo point, Santa		Little Butu . . .	354
Maria . . .	99	Cameroon peak . . .	526
Manuel cape . . .	217	or Half Drowin . . .	379
Martino point . . .	184	Kru . . .	356
Mesurado, cape . . .	343	, river . . .	356
Mindello, Porto Grande . . .	230	Kulloh or Kurrau . . .	348
Morro Colchas, Gran Canaria . . .	180	, rocks . . .	349
Naos port, Lanzarote island . . .	187	Nifu, landing . . .	359
North point, Sal island . . .	237	Ningo . . .	417
, St. Antonio is-		Paps . . .	214
land . . .	227	Piton island . . .	159
Orchilla point, Hierro island . . .	163	Popo . . .	432
Passaro or Bird island, Porto		, anchorage . . .	433
Grande . . .	230	, caution . . .	433
Pechiguera point, Lanzarote . . .	186	, communication . . .	433
Ponta Delgada . . .	88, 89	, current . . .	433
, do Lobo, St. Jago		, depths off shore . . .	433
island . . .	244	, landing . . .	433
Porto Grande . . .	230	, Skarcies river . . .	321
Porto Praya . . .	245	Poros . . .	378
Punta Preta, St. Jago . . .	248	Wappi . . .	359
Temerosa . . .	245	Llewelyn island . . .	264
Rasca point, Tenerife . . .	172	Lobeira point . . .	93
Roque Bermejo, Tenerife		rock . . .	93
island . . .	165	Lobia point . . .	468
Rolla road, St. Nicholas		Lobos island . . .	184
island . . .	235	, anchorage . . .	184
Rusisque . . .	222	, depths off shore . . .	185
San Cristoval, Gomera island . . .	162	Lokko port, creek . . .	322
San Jose, Mayo island . . .	243	Loko, Benue river . . .	487
San Pedro bay, St. Vincent . . .	232	Lomba point . . .	67
, Ye river . . .	378	Lombinha rock . . .	95
, Santa Cruz, Graciosa . . .	80	Lombo Gordo point . . .	93
, Palma . . .	161	du Boi, light . . .	228
, Tenerife . . .	168	Long hill, Meredith point . . .	413
Sardina point, Grand Canary . . .	172	hills, Grand Lahu . . .	384
Sherbro river . . .	331	island, Sherbro river . . .	333
Sierra Leone, cape . . .	323	mountain . . .	374
, Freetown . . .	324	on Devil's island . . .	298
South point, Sal island . . .	237	patch, Garraway point . . .	364
Spartel, cape . . .	103	reef point . . .	346
Tangier . . .	106, 107	Longassi, Cameroon river . . .	530
Tarrafal . . .	248	Loo rock . . .	141
Teno point, Tenerife island . . .	171	light . . .	141
Three points, cape . . .	393	, storm signals . . .	141
Vellas bay, San Jorge island . . .	78	Lookout point, Sierra Leone . . .	323
Verde, cape . . .	216	Los Dientes, water . . .	193
West point, St. Nicholas		isles do, (Idolos) . . .	307-310
island . . .	236	Matillos hills . . .	136
Lights, general . . .	33	Moretes or cape Nun . . .	131
Limboh point . . .	525	, depths off shore . . .	131
Little Akwa river . . .	518	Pexos . . .	172
Bassa river . . .	345	Louis creek, river Nun . . .	474

	Page
Lourenzo rock - - -	156
Lukoja - - -	484
——, communication - -	485
——, dangers - -	484
——, supplies - -	485
Lumeh or Beh beach - -	432
Luz town, Fogo island - -	248

M.

Macarthy fort, Cape Coast Castle -	406
MacCarthy's island - -	267
—— anchorage - -	268
—— pilots - -	268
—— supplies - -	268
—— tidal streams - -	268
—— tides - -	268
MacDonald point - -	462
Macdowell point - -	347
Machado point, light - -	232
—— Sal - -	238
Machico bay - -	140
Madale de Coto point - -	524
Madeira bank - -	459
—— group - -	26
——, climate - -	28
——, communication - -	28
——, fish - -	28
——, flora and fauna - -	26
——, geology - -	26
——, population - -	27
——, ports - -	28
——, products - -	27
——, trade - -	28
——, winds and weather - -	42
——, wine - -	27
—— island - -	137
——, boat harbours - -	137
Madeleine channel - -	217
—— islands - -	217
Madera point - -	170
Mafengbe - -	329
Mafu - -	210
Magdalena rocks - -	76
—— town - -	76
——, Madeira - -	147
Magrath creek - -	460
Mahona point, anchorage - -	163
Mainaraiwa - -	489
Makwimba - -	342

	Page
Malabata point - -	109
Malaguetas bay - -	248
Malaguia - -	316
Malbusco point - -	99
Maldebarca rock - -	98
Malha point - -	97
—— rock - -	97
Malimba creek - -	532
—— point - -	532
Malmerendo point, Santa Maria island - -	99
——, light - -	99
——, Terceira island - -	82
Maluine bank - -	193
Mambola - -	320
Mamkwadi hill - -	412
Mamua rock - -	402
——, buoy - -	402
Manadas point - -	77
Mancha Blanca - -	165
—— rock - -	165
Mandina creek - -	261
Mandu tree - -	332
Manea river - -	313
——, directions - -	313
——, least depth - -	313
——, tides - -	316
Manel, port - -	290
Manga rock - -	162
Mangor town - -	308
Mangue village - -	247
Manna point, Manna river - -	342
——, Sherbro river - -	231
—— river - -	341
—— river, rocks - -	349
Mano river - -	365
Manoka point, beacon - -	533
Manoika creek - -	266
Mansa Kila islet - -	264
Mansuria town - -	115
Manteri island - -	288
Manuel, cape (Baniul) - -	217
——, light - -	217
Mao bank - -	289
Marchan table land - -	105
Marescaux point - -	462
Marfa or cape Mount river - -	342
Marguerite island, beacon - -	205
Marigot de Bakea - -	304
—— de Bania - -	303
—— de Yauguya - -	303
—— des Maringouins - -	209
Mark tree, New Calabar - -	507

	Page		Page
Marmora, New, or Mehediya	- 112	Mazighan, supplies	- 118
———, Old	- 112	———, shoal	- 117
Marocco, climate	- 3	———, tides	- 119
———, communication	- 2	———, trade	- 118
———, fisheries	- 3	———, town	- 117
———, flora and fauna	- 2	Mbenda point	- 532
———, general remarks	- 1	——— beacon	- 533
———, landing	- 2, 104	Mboro village	- 215
———, minerals	- 2	Mbur bank	- 224
———, population	- 2	——— tides	- 225
———, ports	- 2	——— village	- 224
———, products	- 2	Meano or Una harbour	- 132
———, rivers	- 1	Mechlin river	- 346
———, trade	- 2	Mehediya, or New Marmora	- 112
———, winds	- 35	——— current	- 113
Maroon islet	- 328	——— depths off shore	- 113
Marques de la Ensenada	- 174	Meheux islands	- 328
Marqueza point	- 93	———, dangers	- 328
Marshall	- 345	Mel island	- 291
——— point	- 345	Melenara point	- 179
Martinho bank	- 283	Méléye sand-hills	- 214
——— creek	- 283	Mellakori river	- 316
——— point, Jeba channel	- 283	———, anchorage	- 317
Martino point, light	- 184	———, beacons	- 317
Marvão point	- 99	———, buoys	- 317
Maspalomas anchorage	- 180	———, caution	- 317, 319
Massa tower	- 115	———, directions	- 317
Mat point	- 310	———, north channel	- 318
Mata bank	- 275	———, pilots	- 316
———, cape	- 274	———, rock	- 317
Matakong island	- 314	———, shoal	- 316
——— aspect of the coast	- 314	———, supplies	- 316
——— depths off shore	- 315	———, tides	- 319
Matas Blancas	- 182	Mendora creek	- 266
Matillos hills, Los	- 136	Meredith point	- 412
Matorial bay	- 185	Mesa de Marchan	- 105
Matos point	- 98	Mesurado, cape	- 343
Mattheus, S., point	- 75	———, light	- 343
Matumal creek, Cameroon river	- 531	———, river	- 343
Maya point, landing	- 94	———, bar	- 344
Mayel Balevel river	- 476	Messira village	- 255
Mayo island	- 242	Mianyu (Green patch point)	- 531
———, current	- 244	——— beacon	- 533
———, light	- 243	Middle bank, Bijouga islands	- 282
———, mountains	- 242	——— Bassa	- 346
———, supplies	- 242	——— ground, Bonny river	- 501
———, tides	- 244	———, patch	- 502
Mayondi mount	- 302	———, Gambia river	- 257
Mazighan, cape	- 117	———, buoy	- 257
———, communication	- 118	———, Mellakori river	- 317
———, directions	- 118	———, Sherbro river	- 333
———, landing	- 118	———, Sierra Leone	- 322
———, quarantine	- 118	———, Nifu	- 359

	Page		Page
Middle point, cape Palmas	366	Monrovia, landing	344
Middle reef, Sinu bay	355	———, supplies	344
Middleton point	287	———, tides	344
——— river	467	Montaña Clara island	189
———, bar	467	Monte Formoso	235
———, depths off shore	468	——— Gordo	234
———, directions	467	——— Grande	233
———, tides	468	——— Sal	236
Mikanye creek	531	———, Pico island	70
Miller island	467	——— Queimada	70
Milo river	476	——— Vermelho	81
Mindello, town	230	Monteiro point	77
Mirik, cape	207	———, landing	79
Misterio point	76	Moore point	457
Mobido village	445	Mopti	478
Modeaka creek	531	Mordeira bay	238
Mogador, anchorage	125	———, anchorage	238
———, coals and supplies	123	———, shoal ground	238
———, communication	123	Morebaia river	313
———, currents	46	———, directions	313
———, depths off shore	122	———, granite rock	314
———, entrances	125	———, tides	316
———, fresh water	123	———, village	314
———, harbour	124	Morikaria river	316
———, island	124	Mori point	408
———, landing	124	Moretes, Los, or cape Nun	131
———, quarantine	124	Morro Colchas, light	180
———, road	126	——— das Capellas point	95
———, tides	126	——— de la Vieja	173
———, town	123	——— do Lemo	78
———, trade	124	——— do Rabo do Peixe point	94
———, winds and weather	36	——— Grande, Flores island	66
———, wreck, buoy	124	———, San Jorge	78
Mogan point	181	——— point, landing	94
Mohikrako point	377	——— Jable point	185
Moji	477	———, caution	185
Mojon Blanco point	186	———, depths off shore	185
Mokushu bay	531	Mortality or Bruko point	381
Monanga peninsula	527	Morton bay, landing	526
Monchique islet	68	Mosteiros islet	95
Mondoleh island	527	——— point	95
Money village	529	Mount Appra	413
Mongo-ma-Etindeh peak	526	——— Bedford	382
——— Loba peak	526	——— Brazil	83
Moniz island	149	———, cape	342
——— point	149	———, communication	342
——— town	149	———, Half, river	342
Monkey creek	518	———, anchorage	342
——— rock	360	——— Heathfield	392
Monrovia	343	——— Herbert	488
——— bay	344	——— Hewitt	519
———, anchorage	344	——— Katie	490
———, communication	344	——— Lahu	384

	Page		Page
Niger river, navigation above the		Nun, cape	469
delta	482	river	469
principal town and trading ports	482	Akassa	469
route to, by Forcados	464	above Akassa	473
upper	477	anchorage, inner	472
winds and weather	40	outer	472
Nimbi creek	496	bar, depth	471
directions	496	buoys	472
Ninepia rock	394	channel	471
Ningo, Grande peak	419	depths off shore	473
Great	418	directions	472
Little	417	eastern spit	471
river	419	entrance	469
Niobe reef	347	pilots	472
Nipple mount	103	tidal streams	471
Niumiuru or Dagir river	382	tides	471
Nordeste point, Corvo island	65	western spit	471
Norte point, Corvo island	65	Nuñez river	296
Grande point, San Jorge island	78	anchorage	297, 299
landing	79	coal	296
North bluff	240	communication	296
cape Blanco	119	directions	296, 298
cay	239	supplies	296
island	340	tidal streams	299
point, Mayo island	243	tides	299
Middleton river	468		
St. Antonio island	227		
light	227		
St. Nicholas island	236		
Sal island	237		
light	237		
Sinu river	355		
peak, Factory island	308		
reef, Mayo island	243		
Sinu bay	355		
North-east point	236		
rock, Porto Santo	156		
west bay, St. Nicolas	236		
patches, St. Anns, shoals	339		
Nostra Senhora do Monte church	142		
Nossa Senhora da Luz	243		
Notown reach	269		
Nuckba island	380		
Numan, Benue river	489		
Nun or Assaka river	131		
anchorage	182		
Nun, cape or Los Moretes	131		
depths off shore	131		
discoloured water	131		

O.

Obajo factory	512
Obáne or Bonny river	502
Obobi or Booby town	452
Observation point, Pongo river	301
Odekwe	482
Odeni, Benue river	487
Odi vista (Ajimo)	445
Odube creek	463
directions, Wari to	
Gauagana, through	463
Oeste point, Corvo island	65
Ogolokiam, Sombrero river	498
Ogoni creek	511
Ogrugu	483
Ogu village	461
Oguta creek	475
town	475
Oguburi river	473
Ogun river	443
Ohombela creek	511
factory	512
Oil rivers, winds and weather	40
Oione or Kalaba	516

	Page		Page
Palm grove cape - - -	120	Passaro, Bird or Jow island - - -	229
Palmira bay - - -	238	-----, light - - -	230
----- point - - -	238	-----, scma-	
Palm oil rivers - - -	20	----- phore - - -	230
-----, climate - - -	21	----- or Bird island, Sal - - -	238
-----, commerce - - -	20	----- island, Jeba river - - -	285
-----, communication - - -	21	Patala river - - -	303
-----, season - - -	20	Patatale creek - - -	269
-----, trade - - -	20	Patteh mount - - -	484
----- point, Nun river - - -	469	Pau Kandî tree - - -	332
-----, village - - -	510	Paul do Mar - - -	147
Pangon island - - -	267	Pechiguera point - - -	186
Papaguio islands - - -	283	-----, light - - -	186
Papagayo point - - -	186	Pé do Monte - - -	70
Pappa creek - - -	263	Pedra de Galha rock - - -	199
-----, tidal stream - - -	264	Pedralva rocks, beacon - - -	286
----- islands - - -	263	Pedregal point, Grande Dezerta - - -	153
Paps of Cape Verde - - -	215	Pedrobarba point - - -	189
Parcels breakers, Cacheo river - - -	275	Peligro point - - -	161
Pargo point - - -	147	Pelourinho fort - - -	114
-----, depths off shore - - -	148	Pendurados point, landing - - -	98
-----, storm signals - - -	148	Penedo bay - - -	186
-----, port - - -	148	----- redondo rock - - -	155
Parrot island - - -	517	Penfold island - - -	464
Pasha - - -	486	Peñha Grande cliff - - -	192
Pashu rock - - -	361	-----, water - - -	193
Pasito point - - -	187	Peninsula point - - -	392
Paso Alto battery - - -	166	Pennington river - - -	467
Passages, Full powered, auxiliary steam and sailing :-		----- tides - - -	468
Ascension to St. Helena and back - - -	59	Pepré point - - -	390
----- the Coast of Africa - - -	61	Pescador islet - - -	155
Bight of Benin to Ascension - - -	61	----- rock - - -	100
----- Biafra to England - - -	60	Pesebre point - - -	183
----- Sierra Leone - - -	60	Pesqueiro point - - -	65
Cape of Good Hope to England - - -	57	Peter Fortis point - - -	500
----- St. Helena - - -	57	Pickaninny Bassam - - -	385
----- Verde islands to Gibraltar - - -	59	----- Lahu - - -	383
Coast of Africa to St. Helena - - -	62	----- Sesters - - -	361
England to Cape of Good Hope - - -	51	Pico Alta, Santa Maria - - -	96
----- Sierra Leone - - -	58	----- Caboco - - -	68
----- St. Helena and back - - -	58	----- da Cruz - - -	83, 86
Equator to the Cape of Good Hope - - -	56	----- Maffa - - -	95
Gibraltar to Cape Verde islands - - -	59	----- Vara - - -	86
Sierra Leone to Ascension and back - - -	59	----- de la Cruz, Palma - - -	160
----- the Bight of Biafra - - -	60	----- Nunez - - -	93
----- England - - -	59	----- Pinto - - -	85
St. Helena to the Cape of Good Hope - - -	57	----- Gordla, Fayal - - -	69
----- Coast of Africa - - -	61	----- island - - -	74
To the southward along the coast of Africa - - -	62	-----, communication - - -	74
Working to windward in the Bight of Benin - - -	62	-----, depths off shore - - -	76
		-----, landing - - -	76
		-----, rollers - - -	76
		-----, sub-marine cable - - -	76

	Page		Page
Pico Negro point - - -	81	Ponta Delgada, communication -	88
— Ruivo - - -	137	—, custom - house and	
— Topo - - -	74	—, quarantine -	89
— Vermelho - - -	95	—, directions -	90
Piedade village - - -	76	—, hospitals -	88
Piedra Lume - - -	237	—, lights -	88, 89
Piedras point - - -	274	—, repairs -	88
Pigeons point - - -	104	—, shoals -	90
Pilones, anchorage - - -	193	—, signals -	91
Pilots passage - - -	294	—, steam tugs -	89
Pim bay, Fayal island - -	70	—, tides -	91
— port - - -	70	—, trade -	89
Pinos mountain - - -	242	—, water -	88
Pinnocks factory - - -	463	— do Atum point -	247
Pipon patch - - -	292	— de Incaõ -	155
Pirate bay, Sierra Leone -	322	— do Ribeira Julian -	229
— or Bobia island - - -	527	— dos Frades -	155
— rocks - - -	528	— Preta light -	248
Pitada cove - - -	246	— Ribeirinha -	231
Piton islands - - -	158	Pontinha, Funchal -	143
—, directions - - -	159	—, landing places -	143
Plaintain islands - - -	330	— point, San Jorge -	77
Plassa mount - - -	356	—, landing -	79
— river - - -	355	Poor point - - -	374
Playa Blanca river or wadi Aureora	130	— river - - -	374
— de los Ingles, anchorage -	163	Popo, <i>see</i> Great - - -	433
— de Santiago, anchorage -	163	—, <i>see</i> Little - - -	432
Pobamo river - - -	351	Portale harbour or Saint Francis	244
— rocks - - -	351	Portendiek - - -	208
Pobinguem village - - -	223	—, directions -	209
Podor - - -	210	—, roadstead -	208
Pomp island - - -	290	—, tides -	209
Pompendi point - - -	397	Porto Caxorro, landing -	76
— reef, shoal - - -	397	— Consado - - -	133
Pongo river - - -	300	— da Cruz - - -	151
—, anchorage off - - -	302	—, anchorage -	151
—, bars - - -	300, 301	— do Lobo, light -	244
—, buoys - - -	301	— dos Frades -	155
—, caution - - -	302	— Grande - - -	230
—, current of - - -	304	—, anchorage -	232
—, directions - - -	300-302	—, caution -	232
—, supplies - - -	303	—, coal -	230
—, tidal stream - - -	304	—, signals -	231
—, tides - - -	304	—, communication -	230
Poni town - - -	418	—, custom-house -	231
— landing - - -	418	—, directions -	232
Ponta Columna - - -	229	—, hospital -	231
— da Ilha - - -	75	—, lights -	230
— Delgada - - -	87	—, Orontes bank -	231
—, anchorage - - -	89	—, post office signals -	230
—, buoys - - -	89	—, prohibited anchorage	232
—, breakwater - - -	88	—, quarantine -	221
—, coal and supplies -	88	—, repairs -	231

	Page		Page
Porto Grande, supplies - - -	231	Portuguese, Guinea, ports - - -	8
-----, telegraph cables, buoys	231	-----, products - - -	8
-----, tides - - -	232	----- road - - -	242
-----, trade - - -	232	Porura or Afiao - - -	431
-----, tugs - - -	231	Potu lagoon - - -	387
----- Novo - - -	435	Povoação village - - -	93
-----, anchorage - - -	436	Powell point - - -	460
-----, boundary - - -	436	Prah rock - - -	402
-----, depths of shore - - -	436	Praia de Gatta bay - - -	229
-----, lagoon - - -	436	Prainha bay - - -	99
-----, trading station - - -	436	----- village - - -	76
-----, village, Madeira - - -	140	Prampram - - -	418
----- or Leon islet - - -	233	-----, anchorage - - -	418
----- Praya - - -	245	-----, communication - - -	418
-----, anchorage - - -	247	-----, landing - - -	418
-----, bank - - -	246	-----, supplies - - -	418
-----, beacon - - -	246	Praya bay, Fayal - - -	71
-----, coal and supplies - - -	246	-----, Graciosa - - -	80
-----, caution - - -	247	-----, anchorage - - -	80
-----, communication - - -	245	-----, landing - - -	81
-----, hospital - - -	246	-----, Terceira - - -	82
-----, lights - - -	245	-----, anchorage - - -	82
-----, pier - - -	246	----- da Norte bay - - -	71
-----, quarantine - - -	247	----- Formosa - - -	146
-----, shoals - - -	246	----- island - - -	80
-----, submarine telegraph		----- porto, St. Jago - - -	245
cables - - -	247	----- town, Terceira - - -	82
-----, tides - - -	247	-----, coal and supplies - - -	82
-----, trade - - -	246	-----, communication - - -	82
----- Santo bay - - -	154	Preguiza fort - - -	235
-----, anchorage - - -	155	-----, lights - - -	235
-----, caution - - -	155	-----, quay - - -	235
-----, depths off shore - - -	157	Price or Daérébru point - - -	381
-----, landing - - -	155	Princesse Alice bank - - -	74
-----, supplies - - -	154	Prudente shoal - - -	310
-----, tides - - -	155	Pua river - - -	351
-----, villa Baleira - - -	154	Puerta Calheta - - -	243
----- island - - -	154	----- de Santiago - - -	248
----- Seguro or Gomaluta - - -	432	----- Orotava - - -	170
-----, anchorage - - -	432	----- anchorage - - -	171
-----, lagoons - - -	431	----- communication - - -	171
-----, supplies - - -	432	----- old town - - -	170
----- Velho - - -	235	----- del Norte - - -	239
Portudal, anchorage - - -	224	Pullam island - - -	292
-----, landing - - -	224	----- shoals - - -	292
Portuguese bank - - -	501	Pulloi or Palaver mount - - -	434
----- channel - - -	505	Punshavel point - - -	225
-----, directions - - -	505	Punta Alvacora - - -	235
-----, Guinea - - -	8	----- Coruja or Queimadinhos - - -	236
-----, climate - - -	8	----- Creoulo (East point) - - -	233
-----, communication - - -	8	----- Cruz - - -	233
-----, flora and fauna - - -	8	----- das Bicudas - - -	245
-----, population - - -	8	----- del Morro - - -	133

	Page		Page
Punta do Sol, light - - -	227	Ras-ul-Hadik - - -	120
— Guadalupe - - -	173	Rasca point, anchorage - - -	172
— Guindaste - - -	140	—, light - - -	172
— Leme Velho - - -	237	Raven mountain - - -	110
— Pataca (Krabbe point) - - -	235	Rawson creek - - -	459
— Pedra d'Enxova (East point) - - -	235	Raza island - - -	234
— Praia dos Mastros - - -	233	Red bank (Bird island) - - -	254
— Preta, light - - -	248	— cape - - -	222
— Tarafe - - -	233	— hill point - - -	237
— Temerosa, light - - -	245	Reef point - - -	239
— Vermelharia - - -	236	Refraction, effects of - - -	52
Pyramid tree, Bonny river - - -	505	Relva point - - -	90
Pyramida point - - -	92	— village - - -	90
Q.		Rendall island - - -	333
Quail island, Porto Praya - - -	246	Rennel's current - - -	45
— beaçon - - -	246	Répin, French post - - -	294
Queen Anne point - - -	408	Repose bay, anchorage - - -	202
Queen's beach - - -	521	— point - - -	202
Queimada, monte - - -	70	Resolute shoal, Gorée - - -	219
— point, Madeira island - - -	140	Restinga point, Hierro island - - -	164
—, San Jorge island - - -	78	Retorta point - - -	93
Quemado islet - - -	188	Rey island - - -	285
Quito island - - -	303	— point - - -	202
R.		Ribeira Brava - - -	147
Rabacal rocks - - -	149	— point, Santa Maria island - - -	98
Rabat - - -	114	— landing - - -	98
—, anchorage - - -	114	— point, St. Miguel island - - -	94
—, communication - - -	114	— Grande town - - -	94
—, depth on bar - - -	114	—, anchorage - - -	94
—, landing - - -	115	— Julian point - - -	231
—, supplies - - -	114	— Quente point - - -	93
—, tides - - -	115	Ribeiras port, Pico - - -	75
—, trade - - -	114	Ribeirinha point, Fayal - - -	71
Rabba - - -	486	—, Pico island - - -	76
Rabil town - - -	240	—, San Miguel - - -	94
— reef - - -	241	Ribiera Barca - - -	247
Raleigh river - - -	337	— Grande or Santiago - - -	247
Ramos river - - -	465	— Prata - - -	247
—, anchorage off - - -	466	Richardtoll - - -	210
—, bar - - -	465	Rickett's island - - -	328
—, depths off shore - - -	466	Rio del Rey - - -	523
—, tides - - -	466	—, buoys - - -	524
Ranger point - - -	363	—, villages - - -	524
Ras Aferni or cape Ghir - - -	127	— Grande or Bolola river - - -	289
— Tegriwelt or cape Sim - - -	126	— Janella - - -	228
		— Sabar - - -	133
		— strait - - -	189
		—, anchorage - - -	189
		—, tidal streams - - -	189
		—, winds - - -	44
		River bluff - - -	507
		— point - - -	394
		— side, Volta river - - -	421

	Page
River side, tides - -	422
Roani bank - -	401
Robat - -	320
Roca Nublado - -	172
Rocha Alta point - -	68
----- rock, Pico - -	76
Rocher plat - -	375
----- point - -	375
Rock Sess factory - -	351
--- town point - -	366
-----, rocks - -	375
Rocky head (shoal), Gonzales island	295
----- point, Mayo island - -	243
----- or Artlett shoal - -	112
Roja mount - -	186
Rokel - -	322
Rokon - -	322
Rolla road - -	235
-----, anchorage - -	235
-----, lights - -	235
-----, supplies - -	235
Rombi mountains - -	526
----- village - -	524
Rombos or Romes islets - -	249
Romeiros point - -	97
Ronda point - -	391
Ropass (Rappace) - -	298
Roque Bermejo islet - -	165
-----, point - -	165
-----, light - -	165
----- El, islet - -	171
Roquete - -	166
-----, signal station - -	166
Rosales point - -	78
----- rock - -	78
Rosalina rock - -	78
Rosario village - -	65
Rosto do Caõ point - -	91
Roth creek - -	463
Rough Corner point - -	500
-----, spit - -	501
Round mountain - -	374
Roxo cape - -	274
----- bank - -	274
Rua Longa point - -	85
Rufisque anchorage - -	222
----- or Venus bank - -	219
----- village - -	222
-----, light - -	222
-----, supplies - -	222
Rugged point, Cameroon river	531
-----, ----- beacon	533
-----, Escravos river	460

	Page
Ruiva (Red) head - .	66
Ruivo Pico - .	137
Ruma or Crawford island -	308
—, anchorage - .	309
—, channels - .	309
—, directions - .	309
—, position - .	309
—, rocks - .	309
—, tidal streams -	310
—, tides - .	310
Russwurm island - .	368

S.

Sabagrega	-	-	-	474
Sabrina shoal	-	-	-	87
Sacrifice island	-	-	-	496
Saddle hill	-	-	-	345
Safi or Asafi bay	-	-	-	120
————, anchorage			-	121
————, communication			-	121
————, depths off shore			-	122
————, landing		-	-	121
————, supplies		-	-	121
————, town		-	-	121
————, trade		-	-	121
——, cape	-	-	-	120
Sagbama	-	-	-	474
Sahara, coast of	-	-	-	4
——, desert of	-	-	-	4
Saiaba island	-	-	-	391
Saibajarsa torrent		-	-	132
Sail rock	-	-	-	152
Saint Andrew or Sassandra river			-	380
—— Anna point	-	-	-	150
—— Ann bay	-	-	-	200
————, shoal	-	-	-	200
————, cape	-	-	-	204, 340
————, shoals	-	-	-	339
————, depths off shore			-	340
————, directions			-	339
————, fish		-	-	339
————, tidal streams			-	339
—— Anthony fort	-	-	-	391
—— Antonio island		-	-	227
————, lights	-	-	-	227, 228
———— mount	-	-	-	244
—— Cyprian bay			-	198
————, depths off shore			-	199
————, unsafe anchorage			-	198

	Page		Page
Saint Francis harbour or Portale	244	Sal island; haze	238
— George bank	272	—, tides	238
— bay	235	Salao point	71
—, squalls	235	Saldé	210
—, del Mina castle	404	Sali	114
— point	350	Salines point, beacon	205
— Jago fort	405	Sallatuk point	316
— island	244	Salmagat	129
—, current	247	Salmone rocks	164
—, lights	244, 245	Sal Rei island	240
—, Porto Praya	245	—, light	240
— John island	205	Salsang	279
—, mount	346	Salt town, Benin river	450
— river, Liberia	346	Salt-pan point	243
—, anchorage	347	Salt Pond town	409
— Joseph mission	225	—, anchorage	409
— Louis, Senegal river	211	—, communication	409
—, anchorage	212	—, dispensary	409
—, coal	212	Salum river	252
—, communication	211	—, buoys	252
—, light	211	—, entrances	252
—, pilots	212	—, supplies	254
—, signals	212	—, tidal streams	254
—, supplies	212	—, tides	254
—, tides	214	—, trade	254
—, tug	212	Salvage island	158
— Martin grove	283	—, directions	158, 159
— Mary, cape	257	—, currents	51
—, anchorage	258	—, Great	158
—, directions	259	Samba bank	294
—, landing	257	Sambo river	316
— island, Gambia river	258	Sami creek	265
— see Sta Maria	96	Samon river	223
— shoal	256	Samphire cove	232
—, tidal stream	261	San Andres, town	166
— Michael, see San Miguel island.		— Antonio point, landing	76
— Nicholas island	234	—, light	83
— tides	236	— mountain	242
— river	497	— Bartholomeo bank	497
— bar	497	—, river	498
— Paul, cape	428	— Bras fort	87
—, anchorage	429	— Cristoval point, light	162
—, depths off shore	429	— Cruz point	156
— river	343	— Domingo rock	162
— Pedro river	270	— Fernando battery	175
— Vincent island	229	— Francisco convent	87
—, lights	230, 232	— Iago	172
Sai-Sai rocks	222	— João point	75
Sakiet el Hamra, wadi	136	— rocks	146
Sal island	237	— Jorge island	77
—, current	239	—, communication	77
—, depths off shore	238	—, depths off shore	79
—, directions	238	—, landing places	79
		—, supplies	77

	Page		Page
San Jorge point - - -	150	Sandy point, Oporto river - - -	513
— river - - -	150	Sangatuk factory - - -	319
— José castle - - -	187	Sangaria bay - - -	305
— José port, light - - -	243	Sangomar bar - - -	252
— Juan Bantista - - -	249	— point - - -	225
— Lazaro - - -	142	Sangwin point - - -	353
— Lourenço bay - - -	97	—, lagoon - - -	353
—, anchorage - - -	98	—, river - - -	352
—, water - - -	98	—, fresh water - - -	353
— islet - - -	97	—, greatest depth - - -	352
— point - - -	97	—, tides - - -	353
—, town - - -	98	Sanitary precautions - - -	21
— Lourenzo point, Madeira island	139	Sankarani river - - -	476
— anchorage - - -	139	Sankuia creek - - -	269
— Matheus point - - -	75	Sankine river - - -	319
— Martin's grove - - -	283	Sano village - - -	303
— Miguel island - - -	86	Santa Barbara river - - -	497
— depths off shore - - -	96	—, town - - -	75
— general appear- — ance - - -	86	— Catalina castle - - -	175
— landing - - -	94	— Catanina point - - -	75
— tides - - -	91	— Cristoval point - - -	162
— fort - - -	166	— Cruz, Flores - - -	66
— valley - - -	169	—, anchorage - - -	67
— Pedro bay, St. Vincent island	233	—, communication - - -	66
—, anchorage - - -	233	—, landing - - -	67
—, light - - -	232	—, point - - -	66
—, telegraph cable - - -	233	—, repairs - - -	67
—, church - - -	87	—, supplies - - -	66
— point, San Miguel - - -	90	—, trade - - -	67
—, shoals - - -	90	—, Graciosa - - -	80
—, village - - -	95	—, anchorage - - -	80
—, or Ye river - - -	378	—, light - - -	80
—, communica- — tion - - -	378	—, tides - - -	81
—, depth - - -	378	—, Madeira - - -	140
—, light - - -	378	—, Marocco. <i>See</i> Agadir - - -	127
—, supplies - - -	378	—, Palma island - - -	161
—, tidal streams - - -	378	—, light - - -	161
—, rock - - -	378	—, St. Antonio island - - -	227
— Roque village - - -	76	—, Tenerife - - -	166
— Sebastian fort - - -	84	—, anchorage - - -	169
— town, Gomera - - -	163	—, bay - - -	168
— Vicenta - - -	149	—, buoys - - -	168
— river - - -	150	—, caution - - -	169
Sand bar, Pongo river - - -	301	—, coal - - -	166
— island, Bonny river - - -	500	—, communica- — tion - - -	166
—, tidal streams - - -	500	—, directions - - -	169
—, Nuñez river - - -	297	—, harbour works - - -	168
Sandeng village - - -	261	—, hospitals - - -	167
— tides - - -	262	—, landing - - -	168
Sandikoli creek, tidal stream - - -	255	—, lights - - -	168
Sandy island, Volta river - - -	420	—, patent slips - - -	167
		—, pilots - - -	167

	Page		Page
Santa Cruz, Tenerife, quarantine	- 167	Senegal and Senegambia, flora and	
-----, repairs	- 167	----- fauna	- 5
-----, storm signals	- 167	-----, geology	- 5
-----, tidal streams	- 170	-----, population	- 6
-----, tides	- 170	-----, ports	- 6
-----, tugs	- 167	-----, products	- 6
-----, trade	- 167	-----, rivers	- 5
----- Katarina point	- 140	-----, trade	- 6
----- Lucia island	- 233	----- islands	- 211
-----, tides	- 234	----- river	- 209
----- Luzia castle	- 99	-----, anchorage off	- 212
----- Maria (St. Mary) island	- 96	-----, approaching	- 213
-----, depths off shore	- 100	-----, bar	- 212
-----, geology	- 24	-----, directions	- 213
-----, landing places	- 98	-----, currents	- 48
-----, port, Sal	- 237	-----, navigability	- 210
-----, sea worms	- 100	-----, tidal streams	- 214
Santiago fort	- 141	-----, tides	- 214
----- point	- 244	-----, Upper	- 210
----- town or Ribiera Grande	- 247	-----, winds	- 36
Sao João, ribeira de	- 141	Sengana branch, Niger river	- 468
Sapele	- 455	-----, depths off shore	- 468
----- anchorage	- 455	Senia mount	- 413
Sara creek, bank, Cacheo river	- 279	----- town	- 413
Sarabelli village	- 303	Serin point	- 224
Sardina bay	- 181	Serra d'Agua valley	- 147
----- point, light	- 172	----- Gorda mountain	- 86
Sarsar Jebel	- 112	Serreta point	- 84
Sasra village	- 410	----- rocks	- 84
Sassandra hills	- 380	Sess town	- 361
----- or St. Andrew river	- 380	-----, shoal	- 361
-----, tides	- 380	Sesters Grand, river	- 362
Sata koi village	- 264	-----, rock	- 362
Say	- 477	-----, town	- 362
Seasons	- 35	----- hill	- 362
Sebu, Wadi	- 112	----- point	- 362
Sedhiu	- 273	-----, Young	- 348
Seisal point	- 149	Setra Kru	- 357
----- town	- 149	-----, sunken dangers	- 357
Seka point, village	- 265	Seven springs, Suwanieh	- 128
Sekan point	- 392	----- fathoms point	- 518
Sekondi, anchorage	- 399	Sha rock	- 354
-----, communication	- 399	Shaingai (Tasso) point	- 330
-----, harbour works	- 399	-----, depths off	
-----, landing	- 399	----- shore	- 330
----- point	- 399	-----, pier	- 330
Sekum river	- 414	Sharf-el-Yahudi or Jews cliff	- 121
Séne bank	- 294	Sharks Nose point	- 310
Senegal and Senegambia	- 5	Shebar entrance, Sherbro river	- 337
-----, climate	- 6	-----, anchorage	- 337
-----, communi-		-----, caution	- 337
----- cation	- 6	-----, least depth	- 337
		-----, tidal streams	- 338

	Page		Page
Sherbro bank, Sherbro island	- 330	Siliff river	- 253
———, Gold Coast	- 400	Sim cape or Ras Tegriwelt	- 126
——— island	- 332	Sin river	- 253
——— river	- 330	Sindidri village	- 488
———, buoys	- 333	Sinu bay	- 355
———, communication	- 331	——— tides	- 355
———, directions	- 334	——— river	- 355
———, hospitals	- 331	———, bar	- 355
———, light	- 331	———, factory	- 355
———, quarantine regulations	331	———, Fishtown beach	- 355
———, supplies	- 331	——— point	- 355
———, tidal streams	- 338	Sisters hills	- 375
———, tides	- 338	——— trees	- 446
———, trade	- 331	Skarcies river, Great	- 320
———, winds and weather	- 39	———, directions	- 320
Shibika, wadi	- 132	———, tides	- 321
Shilling cape	- 327	———, Little	- 321
———, communication	- 327	———, Yellaboi anchorage	- 319
———, landing	- 327	Skyring, cape	- 274
——— islet or Thistle rock	- 327	———, bank	- 274
Ship tree, Benin river	- 455	S'la or Sali	- 113
Shonga	- 486	Snapper reef	- 347
Shore spit, Brass river	- 493	Socorridos river	- 146
Shoroko village	- 445	Sok Ensara or Jorba	- 129
Sidi Abdalla Bettak	- 122	Sokoto river	- 476
Sidi-abu-el-Fedail	- 129	Sokun	- 485
Sidi-ben-Nuar, wadi	- 129	Solamasa bay	- 229
Sidi Mogodol	- 125	Sol point, town	- 147
Sidi Musa, mosque	- 118	———, Bonavista	- 240
Sierra Leone, cape	- 322	———, reef	- 240
———, colony	10, 322	———, punta do	- 227
———, climate	- 11	Solitary rock, Garraway point	- 364
———, communication	11	Sombrero point	- 173
———, flora and fauna	10	——— river	- 498
———, geology	- 10	———, bar	- 499
———, population	- 10	Songrogu or Yolas river	- 273
———, products	- 10	Soso Kuso	- 485
———, trade	- 11	Soudan rock	- 378
———, lights	- 323	South bay or Porto Santa Maria	- 237
———, river	- 322	——— breaker	- 293
———, directions	- 325	——— or Curralinho island	- 241
———, pilots	- 325	——— point, Mayo island	- 244
———, tidal streams	- 327	———, Middleton river	- 467
———, tides	- 327	———, Sal island	- 237
——— town (Freetown)	- 324	———, light	- 237
———, anchorage	- 325	———, St. Antonio island	- 228
———, coal and supplies	324	South-west channel, Cacheo river	- 277
———, communication	324	——— monsoon	- 34
———, jetty	- 324	Souza point	- 97
———, light	- 324	Sozor point	- 273
———, telegraph buoy	- 325	Spanish Protectorate	- 4
———, trade	- 325	———, fisheries	- 4
———, Opobo river	- 513	———, ports	- 4

	Page		Page
Spartel bay - - -	103		
-----, cape - - -	103		
-----, depths off shore	104		
-----, light - - -	103		
-----, race - - -	104		
-----, signal station	104		
Spence factory - - -	352		
----- rock - - -	350		
Sperling rock - - -	358		
Sphinx head - - -	174		
Spit point - - -	196		
Star bay - - -	201		
Stephens point - - -	395		
Stockton creek - - -	343		
Styx bank - - -	157		
Suara creek, Gambia river -	265		
Subbu point - - -	361		
----- rock - - -	362		
Subyack creek - - -	274		
Subono village or Little Wappi	359		
Suchu point - - -	400		
----- reef - - -	400		
Sueiro da Costa hills - - -	388		
Suellaba point - - -	532		
----- beacon - - -	533		
Sugarloaf hill - - -	363		
----- mountain, Marocco coast	129		
-----, depths off shore	129		
-----, St. Nicholas island	234		
----- rock, Corvo island	65		
Sugari river - - -	342		
Suira or Mogador - - -	123		
Sul point - - -	79		
----- rock - - -	97		
Sulima river - - -	341		
Sumba paps - - -	805		
Sunk rock, Corvo island - -	65		
----- or Escolor rock - -	67		
Sus river - - -	128		
Susn river - - -	403		
Suta river - - -	271		
Suwanieh or Tomieh, depths off shore	128		
----- wells - - -	128		
Swallow rocks - - -	358		
Swanzy mount - - -	397		
----- point - - -	396		
Swarton corner - - -	380		
-----, depths off shore	381		
		T.	
		Tabara rock, Cape Coast castle	407
		Tabara's wife rock - - -	407
		Tabeta river - - -	380
		Table of cape Nun - - -	130
		----- tree - - -	363
		Tabu, Grand - - -	373
		-----, anchorage - - -	373
		----- point - - -	373
		----- river - - -	371
		-----, communication	372
		-----, rocks - - -	372
		-----, supplies - - -	372
		-----, tides - - -	373
		-----, water - - -	372
		Tabuia bar - - -	303
		----- town - - -	303
		Tafaraut - - -	136
		Tafa point - - -	371
		Tahu point - - -	376
		----- rocks - - -	376
		----- supplies - - -	376
		----- villages - - -	376
		Takoradi bay - - -	398
		----- point - - -	398
		----- reef - - -	398
		----- supplies - - -	399
		Talabajili point - - -	297
		Talabuncha point - - -	296
		Tamara or Futubar island -	307
		----- shoal - - -	308
		----- water - - -	308
		Tamuscal point - - -	98
		Tando or Tano lagoon - -	388
		-----, river - - -	388
		Tangier bay - - -	105
		-----, anchorage - - -	108
		-----, coal and supplies	107
		-----, communication	107
		-----, hospitals - - -	108
		-----, jetty - - -	107
		-----, lights - - -	106, 107
		-----, point - - -	105
		-----, pratique - - -	108
		-----, repairs - - -	107
		-----, signals - - -	106
		-----, tides - - -	109
		-----, tidal streams - -	109
		-----, town - - -	106

	Page		Page
Tangier bay, trade - - -	108	Telegraph stations, Cape Verde	
-----, tugs - - -	108	----- Islands - - -	32
Tanife point - - -	180	-----, Chama - - -	401
Tanit bay - - -	207	-----, Dakar - - -	220
Tankural, tides - - -	263	-----, Dano - - -	431
-----, village - - -	262	-----, Dix cove - - -	397
Tanna island - - -	316	-----, Elmina - - -	406
----- point - - -	317	-----, French Sudan - - -	9
----- river - - -	318	-----, Fort Goldie - - -	486
-----, anchorage - - -	317	-----, Funchal - - -	142
Tannaneh river - - -	313	-----, Gambia 7, 258	
Tano or Tando river - - -	388	-----, Gold Coast - - -	15
Tantankweri point - - -	410	-----, Graciosa - - -	79
Tarkwa, railway - - -	399	-----, Grand Bassam - - -	386
Tarmarakt, Wadi - - -	127	-----, Horta - - -	72
Tarrafal bay, St. Antonio island - - -	228	-----, Jebba - - -	486
-----, directions - - -	229	-----, Kitta - - -	430
-----, supplies - - -	229	-----, Konakri - - -	311
-----, tides - - -	229	-----, Kong - - -	13
-----, St. Nicholas island - - -	236	-----, Kotonu - - -	435
-----, St. Jago - - -	247	-----, Lagos - - -	18, 439
-----, light - - -	248	-----, Las Palmas - - -	178
-----, supplies - - -	248	-----, Little Popo - - -	433
-----, tides - - -	248	-----, Lukoja - - -	486
Tarrajal port - - -	185	-----, Madeira - - -	28
Tasret, wadi - - -	129	-----, Marocco - - -	3
Tassi town - - -	417	-----, Naos port - - -	187
Tasso town - - -	337	-----, Niger delta - - -	21
Tassu point - - -	354	-----, Palma island - - -	161
Tatubo lagoon - - -	382	-----, Pico - - -	75
Tazacorte anchorage, Palma - - -	162	-----, Porto Praya, St.	
----- village - - -	162	----- Jago - - -	245
Tefelneh cape - - -	127	-----, Portuguese,	
-----, anchorage - - -	127	----- Guinea - - -	8
-----, depths off shore - - -	127	-----, Prampram - - -	418
Tegbeh trees - - -	429	-----, Praya, Terceira 81	
Tegriwelt, Ras or cape Sim - - -	126	-----, Puerto Orotava 170	
Telegraph stations, Accra - - -	415	-----, Saltpond - - -	409
-----, Adda - - -	420	-----, Santa Cruz,	
-----, Ajua - - -	398	----- Tenerife - - -	166
-----, Amokwa - - -	384	-----, San Jorge - - -	77
-----, Anamaboe - - -	409	-----, Senegal and	
-----, Appam - - -	411	----- Senegambia - - -	6
-----, Axim - - -	390	-----, Sierra Leone 11, 324	
-----, Azores - - -	25	-----, St. Louis - - -	211
-----, Bathurst - - -	258	-----, Vincent - - -	231
-----, Bissao - - -	284	-----, Tangier - - -	107
-----, Bonny - - -	503	-----, Terceira - - -	84
-----, Brass river - - -	492	-----, Togoland - - -	16
-----, Bulama - - -	288	-----, Verde, cape - - -	216
-----, Cameroons 23, 530		-----, Winneba - - -	412
-----, Canary islands - - -	31	Telde - - -	179
-----, Cape Coast Castle 407		Tembo point - - -	349

	Page		Page
Tembo river - - -	349	Tidal streams, Flores - -	69
Temerosa, punta or Temeroya -	245	-----, Forcados - -	457, 459
-----, light - -	245	-----, Funchal - -	146
Temma village - - -	417	-----, Isles do Los - -	310
Temple hill - - -	379	-----, Jumbas river - -	255
Teneffe port - - -	180	-----, Jurong creek - -	268
Tendebea, tides - - -	263	-----, Kasamanze river -	274
-----, village - - -	263	-----, Konakri - -	312
Tenerife island - - -	164	-----, Lagos - -	443
-----, appearance - -	164	-----, Nun river - -	471
-----, currents - -	169	-----, Old Calabar - -	523
Teno point - - -	171	-----, Orango channel -	291
-----, light - - -	171	-----, Ouro river - -	197
Tepe village - - -	490	-----, Pappa creek - -	264
Terceira island - - -	81	-----, Pongo river - -	304
-----, communication -	82, 84	-----, Rio strait - -	189
-----, depths off shore -	85	-----, Saint Ann shoals -	339
-----, produce - -	82	-----, Salum river - -	254
-----, volcanic eruption -	85	-----, San Pedro or Ye	
-----, mount - - -	392	-----, river - -	378
Terra Alta point - - -	76	-----, Sand island, Bonny	
Terraba river - - -	488	-----, river - -	500
Tessagua river - - -	298	-----, Santa Cruz, Tenerife	170
Tett town - - -	118	-----, Senegal river - -	214
Thiong island - - -	211	-----, Shebar river - -	338
Thistle rock - - -	327	-----, Sierra Leone - -	327
Three foot rock, cape Palmas	368	-----, Tangier - -	109
----- Points, cape - -	393	-----, Verde, cape - -	216
-----, cape shoals - -	393	Tide rock - - -	151
-----, current - -	49	Tider island - - -	207
-----, inner channel -	394	Tides, Accra to Volta river	417
-----, light - - -	393	-----, Agadir - -	128
-----, tides - - -	394	-----, Akwayafe river - -	523
Tiaré bank - - -	253	-----, Albreda - -	265
Tidal streams, Albreda - -	268	-----, Ambas bay - -	528
-----, Ambas bay - -	529	-----, Appam - -	411
-----, Arguin bay - -	205	-----, Angra bay, Terceira	84
-----, Bangala creek - -	255	-----, Arcas channel - -	287
-----, Bathurst - -	261	-----, Arguin bay - -	205
-----, Benia river - -	452	-----, Axim bay - -	392
-----, Bight of Benin -	428	-----, Azores islands - -	25
-----, Bissao - -	285	-----, Banana islands - -	329
-----, Blanco, cape - -	204	-----, Bathurst - -	261
-----, Bonny river - -	510	-----, Benin river - -	452
-----, Branca island - -	234	-----, Bight of Benin - -	428
-----, Brass river - -	497	-----, Bissao - -	285
-----, Cabras port - -	185	-----, Blanco, cape - -	204
-----, Cacheo river - -	279	-----, north - -	119
-----, Cameroon river -	535	-----, Bobs island - -	338
-----, Corvo island - -	69	-----, Bojador, cape - -	192
-----, Dezerta islands -	154	-----, Bonny town, Bonny river	510
-----, Dodo river - -	467	-----, Branca island - -	234
-----, Fayal - -	74	-----, Brass river - -	497

	Page		Page
Tides, Brava island -	249	Tides, Mazighan -	119
—, Bum-Kittam river -	338	—, Mbur bank -	225
—, Buoy points -	338	—, Mellakori river -	319
—, Burutu -	458	—, Middleton river -	468
—, Cabras, port -	184	—, Mogador -	126
—, Cacheo river -	279	—, Monrovia -	344
—, Cameroon river -	535	—, Morebaia river -	316
—, Cantin, cape -	120	—, Naos port -	188
—, Cape Coast castle -	407	—, Nun entrance -	471
—, Cestos bay -	351	—, Nuñez river, Sand island -	299
—, Componi river -	295	—, Old Calabar river, Duke town -	523
—, Corvo island -	69	—, Opobo river -	515
—, Debreeka river -	306	—, Orango channel -	291
—, Dodo river -	467	—, Ouro river -	197
—, Duke town, Old Calabar river -	523	—, Palma island -	162
—, Edina -	348	—, Palmas, cape -	368
—, El Aráish -	112	—, Pennington river -	468
—, Elmina -	406	—, Pongo river -	304
—, English road -	241	—, Ponta Delgada -	91
—, Eseravos river -	456	—, Port Cabras, Fuerteventura island -	183
—, Fayal -	74	—, Naos, Lanzarote -	188
—, Flores island -	69	—, Portendick -	209
—, Fogo island -	249	—, Porto Grande -	232
—, Forcados river -	458	—, Porto Praya -	247
—, Forikaria river -	316	—, Porto Santo bay -	155
—, Formoso, cape -	491	—, Rabat -	115
—, Funchal -	146	—, Ramos river -	466
—, Fundion -	254	—, Riverside -	422
—, Gallinas river -	341	—, Ruma island -	310
—, Gambia river 261, 262, 263, 265, 266		—, St. Louis -	214
—, Gomera island -	163	—, San Miguel island -	91
—, Gorée island -	219	—, Nicholas island -	236
—, Grand Bassa -	348	—, Sal island -	238
—, Berebi -	376	—, Salum river -	254
—, Grand Lahu -	384	—, Sandeng -	262
—, Great Skarcies river -	321	—, Sangwin river -	353
—, Guet-n'-dar -	214	—, Santa Cruz, or Agadir -	128
—, Hierro island -	164	—, Graciosa island -	81
—, Horta bay -	74	—, Tenerife -	170
—, Isles do Los -	310	—, Lucia island -	234
—, Juby cape -	135	—, Sassandra river -	380
—, Junk river -	345	—, Senegal river -	21
—, Jurong creek -	266	—, Sherbro river -	338
—, Kansala -	262	—, Sierra Leone -	327
—, Kasamanze river -	273	—, Sinu bay -	355
—, Kaolack -	254	—, Skarcies river, Great -	321
—, Konakri -	312	—, Tabu river -	372
—, La Luz harbour -	178	—, Tangier bay -	109
—, Lagos river -	443	—, Tankural -	263
—, Mac Carthy's island -	268	—, Tarrafal bay, St. Antonio -	229
—, Manca river -	316	—, St. Jago -	248
—, Mayo island -	244	—, Tendebe -	263

	Page		Page
Tides, Three Points, cape -	394	Trade town, rock -	348
——, Villa do Porto, Sta. Maria -	99	—— winds -	33
——, Vintang creek -	262	Trepau point -	381
——, Volta river -	422	Trevor point -	197
——, Yellaboi sound -	320	Trigo point, anchorage -	163
——, York island -	338	Tristão islands -	293
Tidsi, wadi -	126	—— point -	148
Timbuktu -	476-479	——, depths off shore -	148
Tinkisso river -	476	Trotter point -	469
Tiñosa reef -	188	—— tree -	472
—— village -	188	Tryh or Garraway river -	363
Titibul creek -	332	—— rocks -	364
Tobacco head, Old Calabar -	517	Tsiakur Bansu point -	400
——, mount -	349	Tua creek, Brass river -	495
Tobé village -	375	——, Pongo river -	303
—— point -	375	—— town -	495
Tobokanni rock -	348	Tnam village -	410
—— - village -	348	Tuba river -	354
Toche channel -	436	Tubab Guialao, cape -	223
Togoland -	16	—— kolong, village -	263
——, climate -	16	Tuburi marshes -	490
——, communication -	16	Tudor point -	265
——, flora and fauna -	16	Tullifer creek -	503, 512
——, population -	16	Tumani -	318
——, ports -	16	Tumbo channel -	310
——, products -	16	—— island -	310
——, trade -	16	—— point -	310
Tomadana point -	181	—— town, New Calabar -	507
Tombali cape -	293	Tund or Méléye hills -	214
——, river -	294	Turtle islands -	340
Tomento -	390	—— point, Sal island -	238
Tom Shot point -	517	——, shoal ground -	238
Tomieh or Seven Springs -	128	Tuto point -	358
Tonde creek -	531	Tuyure village -	259
Topaciagos rocks -	162	Two Fathoms channel, Bonny -	507
Tope da Coroa mountain -	227	—— buoy -	507
Topo islet -	77	——, direc- tions -	507
—— point -	77		
Topsail point, Tamara island -	307		
Tornadoes -	35		
——, directions, at anchor -	35		
——, under sail -	35		
Torraiz point -	65		
Tosei -	477		
Tostan reefs -	182		
Totwarra or Flat island -	359		
Touza point -	181		
Tower tree -	455		
Town, Bight of Benin -	446		
—— point, Mayo island -	243		
Trabuco point -	190		
Trade town -	348		
——, anchorage -	348		

U.

Uina Seguirra torrent -	132
Ukko village -	419
Um es Sabel rivulet -	133
Umona shoal -	192
Unkafala creek -	268
Unsurveyed coast -	293
Uro river -	358
Usaje point -	187
Utshi -	482

	Page		Page
V.		Villa Franca, hospital -	92
Valverde, Ferro island -	163	-----, islet -	92
Vangaran bank -	272	-----, road -	92
Varandinha point -	241	-----, supplies -	92
----- reef -	241	----- island -	99
Varzea point -	95	----- Novo rock -	85
Velho porto or St. George bay -	235	Village point, Nunez river -	297
Vellas bay -	78	Vintang creek -	261
-----, anchorage -	78	-----, anchorage -	261
-----, landing -	79	-----, directions -	261
-----, light -	78	-----, supplies -	261
-----, tides -	78	-----, tides -	262
Venus or Rufisque bank -	219	Virginie rock -	260
Verde, cape -	216	Volcanic eruption, Terecira -	85
-----, currents -	48	Volta river -	420
-----, light -	216	-----, bar -	421
----- paps, -	216	-----, buoy -	421
-----, semaphore -	216	-----, caution, indraught -	422
-----, tidal streams -	216	-----, directions -	421
Verde Cape islands, <i>see</i> Cape Verde		-----, entrance -	421
islands -	31, 227	-----, greatest draught -	422
Verdierfort -	371	-----, tides -	422
Verga, cape -	299	-----, Upper river -	422
----- ridge -	299		
Vermelho monte -	81	W.	
-----, pico -	95	Wadi Abu Regreg -	1, 114
Vernon bank -	417	----- bar -	114
----- fort -	418	----- Aureora -	130
Vicente, San -	149	----- Assa -	129
Victoria, Ambas bay -	527	----- Assaka -	130
-----, supplies -	527	----- Bussefen -	130
----- creek -	531	----- el Khos -	111
----- fort, Cape Coast castle -	406	-----, bar -	111
----- gulf -	379	----- Ifni -	129
----- lagoon -	436	----- Kweraima -	129
-----, Nuñez river -	298	----- Mesa -	128
-----, anchorage -	299	----- Sakiet el Hamra -	136
-----, Sherbro river -	336	----- Sebu -	1, 112
Viento, mount -	161	-----, anchorage -	110
----- point -	170	----- Shibika or Wadi Draa -	2, 132
Villa Baleira or Porto Santo -	154	-----, commerce -	132
----- das Vellas -	78	----- Siad -	130
----- de Orotava -	170	----- Sidi ben Nuar -	129
----- de Porto bay -	99	----- Sus -	1, 128
-----, anchorage -	99	----- Tarmarakt -	127
-----, supplies -	99	----- Tasret -	129
-----, tides -	99	----- Tensift -	1, 121
----- do Agoa do Pao -	92	----- Tidisi -	126
----- Franca, San Mignel -	92	----- Uдеми Fatma -	133

	Page		Page
Wadi um-er-Rebia - - -	117	Whyda, anchorage - - -	434
-----, bar - - -	117	-----, Beach station - - -	434
Waladieh, El - - -	120	-----, communication - - -	434
Walkeria - - -	298	-----, current - - -	422
Walker island, Dodo river - - -	466	-----, depths off shore - - -	434
Walli kunda village - - -	269	-----, supplies - - -	434
Wanangi river - - -	485	Widgeon point - - -	460
----- town - - -	485	Wilberforce island - - -	474
Wappi point, Great - - -	359	William, fort, Cape Coast castle - - -	406
-----, Little - - -	359	-----, light - - -	406
Wappu point - - -	374	-----, signal station - - -	406
----- grove - - -	374	-----, point, Tabu river - - -	371
Warang bank - - -	281	Wilmot point, Lagos river - - -	440
----- channel - - -	281	Wilson point - - -	371
Wari, anchorage - - -	463	-----, Sangwin river - - -	352
-----, communication - - -	462	Winds and weather - - -	33
-----, consulate - - -	462	-----, Arguin island - - -	36
-----, directions, from Goshawk point - - -	462	-----, Azores - - -	41
-----, to Ganagana through Odube creek - - -	463	-----, Banana islands - - -	38
-----, hulk - - -	459	-----, Bight of Benin - - -	39
-----, point - - -	462	-----, Cameroon river - - -	41
-----, town - - -	462	-----, Canary islands - - -	43
-----, river - - -	462	-----, Cape Bojador to Gambia river - - -	36
Warrang village - - -	224	-----, Cape Roxo to Isles de Los - - -	37
Warrigi - - -	455	-----, Cape Verde islands - - -	44
Waterhouse bay - - -	347	-----, Cape Verde to Sierra Leone - - -	37
-----, sunken rock - - -	347	-----, Cavally - - -	39
-----, buoy - - -	347	-----, Gambia river - - -	37
----- point - - -	347	-----, harmattan - - -	35
Wayako - - -	361	-----, Dakar - - -	37
Web, cape St. Paul - - -	429	-----, Isles de Los - - -	38
Wemeh or Okpara river - - -	436	-----, Kasamanze river - - -	37
West bay, anchorage - - -	201	-----, Madeira - - -	42
-----, landing - - -	201	-----, Marocco - - -	35
----- Nianija creek - - -	266	-----, Mogador - - -	36
----- or Inferno rock - - -	190	-----, Niger river - - -	40
----- point, Brass river - - -	492	-----, Oil rivers - - -	46
-----, Forikaria river - - -	316	-----, Senegal river - - -	36
-----, Opobo river - - -	513	-----, Sherboro river - - -	39
-----, St. Nicholas island - - -	236	-----, Sierra Leone to Cape Three points - - -	38
-----, an-chorage, light - - -	236	-----, south - west monsoon - - -	34
-----, Three points, cape - - -	392	-----, tornadoes - - -	35
----- sand-head, Shebar entrance - - -	337	-----, trade - - -	33
Western breakers, Brass river - - -	493	Winneba, communication - - -	412
----- islands or Azores - - -	23, 64	-----, dispensary - - -	412
----- spit, Brass river - - -	493	----- landing - - -	412
White cliff or Haffat-el-beida - - -	111		
----- island - - -	308		
----- man rock - - -	377		
----- rock - - -	377		
Whyda - - -	377		

[illegible]

LIST OF SAILING DIRECTIONS, &c., PUBLISHED
BY THE HYDROGRAPHIC DEPARTMENT
OF THE ADMIRALTY, JANUARY 1900.

<i>Title.</i>	<i>Price.</i>
GENERAL.	<i>s. d.</i>
Ocean passage book, 1st edition, 1895 - - - -	1 6
BRITISH ISLANDS.	
Channel Pilot, part 1. South-west and south coasts of England, 9th edition, 1899. - - - -	2 6
----- 2. Coast of France and the Channel islands, 6th edition, 1897 - - - -	3 6
North Sea Pilot, part 1. Shetland and Orkneys, 4th edition, 1894 - -	2 6
----- Supplement, 1898 - - - -	0 6
----- 2. North and East coasts of Scotland, 5th edition, 1895 - - - -	4 6
----- Revised Supplement, 1900.	
----- 3. East coast of England, from Berwick to the North Foreland, including the estuary of the Thames, and rivers Thames and Medway, 6th edition, 1896 - -	3 0
----- Hydrographic Notice, No. 1 of 1898 - -	0 3
----- 4. Shores of the North sea, from Calais to the Skaw, 5th edition, 1892 - - - -	3 6
----- Supplement, 1896 - - - -	1 0
Sailing directions for the West coast of Scotland, Cape Wrath to Mull of Galloway, including the Hebrides or Western islands, 4th edition, 1894 - - - -	4 0
----- Hydrographic Notice, No. 3 of 1897 - - - -	0 2
Sailing directions for the West coast of England, from Scilly islands to the Mull of Galloway, also the Isle of Man, 4th edition, 1891 - - - -	6 0
----- Hydrographic Notice, No. 3 of 1895 - - - -	0 6
Irish Coast Pilot, 1893 - - - -	3 6
----- Supplement, 1898 - - - -	0 6
NORTH OF EUROPE AND BALTIC SEAS.	
Norway Pilot, part 1. The Naze to Christiania; thence to the Kattegat, 3rd edition, 1897 - - - -	4 0
----- 2. From the Naze to North cape, thence to Jacob river, 2nd edition, 1894 - - - -	5 6
----- Supplement, 1897 - - - -	0 8
Arctic Pilot, vol. 1, sailing directions for the Barents, Kara, and White seas, comprising also the north coast of Russia from the Jacob river to the Yenisei, 1st edition, 1898 - - - -	6 0
Baltic Pilot, part 1, containing directions for the Kattegat, the Sound, Belts, and channels to the Baltic, 3rd edition, 1895 - - - -	5 6
----- Supplement, 1900. (<i>In progress.</i>)	
----- part 2, comprising the Baltic sea, the gulf of Finland, and the gulf of Bothnia, 3rd edition, 1896 - - - -	4 6
----- Supplement, 1900. (<i>In progress.</i>)	

<i>Title.</i>	<i>Price.</i>
ATLANTIC AND MEDITERRANEAN, &c.	<i>s. d.</i>
*Færoe Islands Pilot, 1891 - - - - -	0 9
*Information relating to currents, ice, and magnetism, with general remarks on the coast of Iceland, 1891 - - -	1 0
*Icelandic Pilot, part 1. Coast from cape Reykjanes to Stigahlid, 1897 - - - - -	1 0
Sailing directions for the West coasts of France, Spain, and Portu- gal, from Ushant to Gibraltar strait, also the African coast from cape Spartel to Mogador, 6th edition, 1899. (<i>In progress.</i>)	
Mediterranean Pilot, vol. 1. Comprising Gibraltar strait, coast of Spain, African coast from cape Spartel to gulf of Gabes, together with the Balearic, Sardinian, Sicilian, and Maltese islands, 3rd edition, 1894 - - - - -	5 0
Supplement, 1898 - - - - -	0 4
----- 2. Comprising coast of France and of Italy to the Adriatic; African coast from Jerbah to El Arish; coasts of Karamania and Syria; together with the Tuscan archi- pelago, and islands of Corsica and Cyprus, 3rd edition, 1895 - -	5 0
Supplement, 1898 - - - - -	0 4
----- 3. Comprising the Adriatic sea, Ionian islands, the coasts of Albania and Greece, to cape Malea, with Cerigo islands; including the gulfs of Patras and Corinth, 3rd edition, 1899 - - - - -	4 0
----- 4. Comprising the Archipelago, with the adjacent coasts of Greece and Turkey; including also the island of Candia or Crete, 3rd edition, 1900. (<i>In progress.</i>)	
Sailing directions for the Dardanelles, sea of Marmara, Bosphorus, and Black sea, 5th edition, 1900. (<i>In progress.</i>)	

NORTH AMERICA AND WEST INDIES.

Newfoundland and Labrador Pilot. Comprising also the strait of Belle-isle, the North-east and part of the North coasts of Labrador, 3rd edition, 1897 - - - - -	6 6
Supplement, 1899 - - - - -	1 0
Sailing directions for the South-east coast of Nova Scotia and bay of Fundy, 4th edition, 1894 - - - - -	4 0
St. Lawrence Pilot, vol. 1. Containing sailing directions for the gulf and river St. Lawrence, 6th edition, 1894 - - - - -	3 6

* Arctic Pilot, vol. 2, containing sailing directions for the Færoe Islands, Iceland, Jan Mayen, Spitzbergen, and the east coast of Greenland is in progress, and will supersede the books marked.

<i>Title.</i>		<i>Price.</i>	
NORTH AMERICA AND WEST INDIES— <i>cont.</i>		<i>s. d.</i>	
St. Lawrence Pilot, vol. 2. Containing sailing directions for the southern parts of the gulf of St. Lawrence, and for its South entrance through Chedabucto bay and the gut of Canso, 6th edition, 1895	-	3	6
Sailing directions for the east coast of the United States of America, 1st edition, 1899	- - - - -	3	6
West India Pilot, vol. 1. From cape Orange in Brazil to cape Sable in Florida, with the adjacent islands, 5th edition, 1893	-	3	0
Hydrographic Notice, No. 2 of 1896	-	1	0
----- 2. The Caribbean sea, from Barbados to Cuba, with Florida strait, Bahama, and Bermuda islands, 5th edition, 1899	- - - - -	6	0

SOUTH AMERICA AND PACIFIC OCEAN.

South America Pilot, part 1. East coast of South America, from cape St. Roque to cape Virgins, with the Falkland, South Georgia, Sandwich, and South Shetland islands; also the North coast from cape St. Roque to cape Orange in French Guiana, 4th edition, 1893	- - - - -	4	0
Supplement, 1896	- - -	0	6
----- 2. Comprising Magellan strait, Tierra del Fuego, and West coast of South America from cape Virgins to Panama bay, also the Galápagos islands, 9th edition, 1895	- - -	7	6
Supplement, 1898	- - -	0	6
Sailing directions for the West Coasts of Central America and the United States from the Bay of Panama to Juan de Fuca strait, 1st edition, 1896	- - - - -	3	0
British Columbia Pilot. Coast of British Columbia from Juan de Fuca strait to Portland canal, together with Vancouver and Queen Charlotte islands, 2nd edition, 1898	- - -	5	6
Supplement	- - -	0	6
Sailing directions for Bering sea and Alaska, 1st edition, 1899	-	4	0

AFRICA.

Africa Pilot, part 1. From cape Sparte to the river Cameroon, including the Azores, Madeira, Canary, and cape Verde islands, 6th edition, 1899. (<i>In progress</i>).			
----- 2. From the river Cameroon to the cape of Good Hope, including Ascension, St. Helena, Tristan da Cunha, and Gough islands, 4th edition, 1893	- - -	3	6
Hydrographic Notice, No. 2 of 1897	-	0	8

<i>Title.</i>	<i>Price.</i> <i>s. d.</i>
AFRICA—cont.	
Africa Pilot, part 3. South and East coasts of Africa from the cape of Good Hope to cape Guardafui, also islands in the main route through Mozambique channel, 6th edition, 1897 -	4 0
INDIAN OCEAN, &c.	
Red Sea and Gulf of Aden Pilot. Containing description of the Suez canal, the gulfs of Suez and Akabah, the Red sea and strait of Báb-el-Mandeb, the gulf of Aden with Sokótra and adjacent islands, and part of the Eastern coast of Arabia, 5th edition, 1900. (<i>In progress.</i>)	
Persian Gulf Pilot. The gulf of Omán, and the Makran coast, 4th edition, 1898 - - - -	4 0
West coast of Hindustán Pilot, including the Gulf of Manar, the Maldive and Lakadive islands, 4th edition, 1899 - - - -	4 0
Bay of Bengal Pilot. Containing Sailing directions for the bay of Bengal, and the adjacent coasts of Hindustan, Burma and Siam, together with Ceylon, the Nicobar and Andaman islands, and the north coast of Sumatra, 2nd edition, 1892 -	4 6
Hydrographic Notice, No. 4 of 1895 - - - -	0 6
Islands in the Southern Indian ocean westward of longitude 80° E., including Madagascar, 1891 - - - -	5 0
Supplement, 1898 - - - -	0 9
CHINA SEA, AUSTRALIA, NEW ZEALAND.	
China Sea Directory, vol. 1. Containing approaches to the China sea, by Malacca, Singapore, Sunda, Banka, Gaspar, Carimata, Rhio, Berhala, and Durian straits, 4th edition, 1896 - - - -	4 0
Supplement, 1899 - - - -	0 8
----- 2. Directions for the China sea between Singapore and Hong-kong, 4th edition, 1899 - - - -	4 0
----- 3. Comprising the coast of China, from Hong-kong to the Korea; north coast of Luzon, Formosa island and strait; the Babuyan, Bashi, and Meiacó Sima groups; Yellow sea, gulfs of Pechili and Liautung. Also the rivers Canton, West, Min, Yung, Yangtse, Yellow, Pei Ho, and Liau Ho, and Pratas island, 3rd edition, 1894 - - - -	4 6
Supplement, 1898 - - - -	0 4
----- 4. Comprising the coast of Korea, Russian Tartary, Japan islands, gulfs of Tartary and Amur, and the sea of Okhotsk; also the Meiacó, Liukiu, Linschoten, Mariana, Bonin, Saghalin, and Kuril islands, 3rd edition, 1894 -	3 6
Supplement, 1898 - - - -	0 4

	<i>Title.</i>	<i>Price.</i> <i>s. d.</i>
CHINA SEA, AUSTRALIA, NEW ZEALAND— <i>cont.</i>		
Eastern Archipelago, part 1.	Comprising the Philippines, Sulu archipelago, North-east coast of Borneo, Celebes sea, North-east coast of Celebes, Molucca and Gillolo passages, Banda and Arafura seas, North-west and West coasts of New Guinea, and North coast of Australia, 1st edition, 1890 - - -	4 6
	Revised Supplement, 1898 - - -	0 9
-----	2. Comprising the South-east coast of Sumatra, Java, the islands East of Java, Celebes, and the South and East coasts of Borneo, 1st edition, 1893 - - -	5 0
	Supplement, 1899 - - -	0 8
Australia Directory, vol. 1.	South and East coasts, Bass strait, and Tasmania, 9th edition, 1897 -	5 0
-----	2. Comprising the East coast from Sydney to Torres strait. Torres strait. Coral sea. Also a part of Carpentaria gulf, 5th edition, 1898	4 0
-----	3. North, North-west, and West coasts, from the gulf of Carpentaria to cape Leeuwin, with directions for passages through the neighbouring seas, 3rd edition, 1895 - - -	4 6
	Supplement, 1898 - - -	0 6
New Zealand Pilot, including also the Chatham islands, and the off-lying islands southward of New Zealand, 7th edition, 1900. (<i>In progress.</i>)		
* Pacific Islands, vol. 1	(Western groups). Sailing directions for the South-east, North-east, and North coasts of New Guinea, Louisiade, d'Entrecasteaux, New Hebrides, Solomon, New Ireland, New Britain, Admiralty, and Caroline islands, 2nd edition, 1890 - - -	4 6
	Supplement, 1894 - - -	0 9
-----	part 2. Containing sailing directions for New Caledonia, Loyalty islands, Bank, Torres, and Santa Cruz groups, and supplementary information on New Hebrides, 1893 - - -	4 0
	Hydrographic Notice, No. 1 of 1894 -	0 3
	Hydrographic Notice, No. 1 of 1895 -	1 0
* -----	2. (Central and Eastern groups). Sailing directions for the Fiji islands, Kermadec, Tonga, Samoa, Union, Phoenix, Ellice, Gilbert, Marshall, Tubuai, Cook, and Society islands; Paumotu, or Low archipelago; Marquesas; Line islands or scattered islands near the equator, and the Sandwich islands, 2nd edition, 1891 -	4 0

* The whole of the sailing directions for the Pacific are now undergoing revision, and will be published in 1900 in three volumes.

	<i>Title.</i>	<i>Price.</i> <i>s. d.</i>
CHINA SEA, AUSTRALIA, NEW ZEALAND— <i>cont.</i>		
Pacific Islands, vol. 2. Hydrographic Notice, No. 7 of 1895	-	0 4
„ „ No. 7 of 1897	-	0 6

TABLES.

Towson's great circle tables	-	1 0
Sun's true bearing or azimuth tables (Burdwood) between the parallels of 30° and 60° inclusive, 1894	-	4 6

DEVIATION OF THE COMPASS, &c.

Practical rules for ascertaining and applying the deviation of the compass, 1892	-	0 6
Admiralty manual for ascertaining and applying the deviations of the compass, 6th edition, 1893	-	3 0
Questions and answers relating to the compass, 1898	-	0 6

LISTS OF LIGHTS.—*Corrected annually to the 31st December.*

Part I.—British islands	-	1 6
Part II.—North and White seas	-	2 0
Part III.—Baltic	-	2 0
Part IV.—Western shores of Europe and Africa from Dun-kerque to the Cape of Good Hope, including Azores, Madeira, Canary, Cape Verde islands, &c.	-	1 6
Part V.—Mediterranean, Black, Azov, and Red seas	-	1 6
Part VI.—South Africa, East Indies, China, Japan, Australia, Tasmania, and New Zealand	-	2 0
Part VII.—South America, western coast of North America, Pacific islands, &c.	-	1 0
Part VIII.—Eastern shores of North America and Central America from Labrador to the River Amazons, including Bermuda and islands of the West Indies	-	2 6

TIDES.

Tide tables for British and Irish ports, and also the times of high water for the principal places on the Globe (published annually)	2 0
Notes on the tidal streams at the entrance of the English channel	1 0

MISCELLANEOUS.

Catalogue of charts, plans, and sailing directions, corrected annually to 31st December	-	1 0
Admiralty manual of scientific enquiry	-	2 6
Signs and abbreviations adopted in the Admiralty charts	-	0 6
Remarks on revolving storms, 3rd edition, 1883	-	0 3
List of time signals established in various parts of the world, 1898	-	1 0
Distances and heights	-	0 6
Dock book, containing dimensions of the wet and dry docks, patent slips, &c., of the world, with information relating to shipbuilding and engineering works, 1900. (<i>In progress.</i>)	-	-
Appendix to Dock book, 1898	-	0 8
On the Station pointer, and the manner of fixing a ship's position by its aid, 1886	-	0 6
Notes bearing on the navigation of H.M. Ships, 1893	-	0 2
Index to Notices to Mariners, 1898	-	1 0

ADMIRALTY AGENT FOR THE SALE OF CHARTS.

LONDON	-	-	J. D. Potter	-	-	31, Poultry, E.C.
"	-	-	"	-	-	11, King St., Tower Hill, E.

SUB-AGENTS

(In the United Kingdom).

BARRY	-	-	T. L. Ainsley	-	-	1, Tip.
BELFAST	-	-	F. M. Moore	-	-	102, High Street.
BRISTOL	-	-	C. W. Price	-	-	1 and 2, Broad Quay.
CARDIFF	-	-	T. J. Williams	-	-	3, Bute Docks.
"	-	-	H. R. Ainsley	-	-	Primavesi Chambers, James Street.
CORK	-	-	A. W. Sutton & Co.	-	-	46, Warren Place.
COWES (WEST)	-	-	Pascall, Atkey, & Son	-	-	29, High Street.
"	"	-	G. H. May & Co.	-	-	126 and 127, High Street.
DARTMOUTH	-	-	Cranford & Son	-	-	Library, Fairfax Place.
DOVER	-	-	C. Clout	-	-	135, Snargate Street.
DUNDEE	-	-	P. A. Feathers & Son	-	-	43, Dock Street.
DUBLIN	-	-	Hodges, Figgis, & Co., Ltd.	-	-	104, Grafton Street.
"	-	-	F. M. Moore	-	-	23, Eden Quay.
FALMOUTH	-	-	Williams & Co.	-	-	The Quay.
GLASGOW	-	-	Whyte, Thomson & Co.	-	-	144, Broomielaw.
"	-	-	A. Dobbie & Son	-	-	45, Clyde Place.
"	-	-	D. M'Gregor & Co.	-	-	37, Clyde Place.
GREENOCK	-	-	R. Love	-	-	17, West Blackhall Street.
GRIMSBY	-	-	O. T. Olsen	-	-	Fish Dock Road.
HARTLEPOOL	-	-	G. Pearson	-	-	24, High Street.
HARWICH	-	-	John Groom & Sons	-	-	Lloyd's Agents.
HULL	-	-	Newton Bros. & Holliday	-	-	Prince's Dock.
"	-	-	W. Hakes	-	-	Commercial Road.
LEITH	-	-	D. Stalker	-	-	6 and 8, Commercial Street.
LIVERPOOL	-	-	Philip, Son & Nephew	-	-	49 & 51, South Castle Street.
"	-	-	John Parkes & Son	-	-	43, Canning Place.
"	-	-	Frodsham & Keen	-	-	31, South Castle Street.
"	-	-	John Bruce & Son	-	-	60, South Castle Street.
"	-	-	D. M'Gregor & Co.	-	-	72, South Castle Street.
LONDON	-	-	J. Imray & Son	-	-	89, Minories, E.
"	-	-	E. Stanford	-	-	26, Cockspur Street, S.W.
LONDONDERRY	-	-	E. A. Minniece	-	-	23, Ship Quay Street.
MARYPORT	-	-	Quintin Moore	-	-	Harbour House.
MIDDLESBROUGH	-	-	Constantine, Pickering, & Co.	-	-	Docks.
NEWCASTLE-ON-TYNE	-	-	M. S. Dodds	-	-	61, Quayside.
"	"	-	S. A. Cail & Sons	-	-	29 and 31, Quayside.
NORTH SHIELDS	-	-	Wilson & Gillie	-	-	New Quay.
NEWPORT, MON.	-	-	E. E. Williams	-	-	94, Dock Street.
OBAN	-	-	Hugh Macdonald	-	-	"Times" Office, Esplanade.
PLYMOUTH	-	-	G. E. Hicks	-	-	17, Southside Street.
PORTSEA	-	-	Griffin & Co.	-	-	2, The Hard.
QUEENSTOWN	-	-	T. Miller	-	-	1, Harbour Row.
SOUTHAMPTON	-	-	S. W. Wolff	-	-	76, High Street.
"	-	-	J. G. Fay & Co., Ltd.	-	-	80 and 90, High Street.
SUNDERLAND	-	-	T. Reed & Co.	-	-	184, High Street West.
"	-	-	J. J. Wilson	-	-	18 & 19, Hudson Road.
SOUTH SHIELDS	-	-	T. L. Ainsley	-	-	Mill Dam.
SWANSEA	-	-	F. Martin	-	-	1 and 10, Somerset Place.

SUB-AGENTS

(Abroad).

AMSTERDAM	-	L. J. Harri	-	Prins Hendrikhade, No. 90.
BERLIN	-	D. Reimer	-	29, Wilhelm Strasse.
"	-	A. Asher & Co.	-	13, Unter den Linden.
BREMERHAVEN	-	W. Ludolph	-	72, Snidt Strasse.
BRISBANE	-	Watson, Ferguson & Co.	-	Queen Street.
CAPE TOWN	-	J. C. Juta & Co.	-	Booksellers.
GIBRALTAR	-	Mercer & Skaügen	-	Dock Road.
"	-	C. G. Molinary	-	Shipchandler.
HAGUE, THE	-	Van Cleef Brothers	-	Libraries.
HAMBURG	-	Eckhardt & Messtorff	-	Steinhof I.
"	-	Thos. Downie	-	9, Stubbenhuk.
"	-	Friederichsen & Co.	-	61, Neuer Wall.
HAVRE	-	V. & M. Lepetit	-	13 and 15, Rue de Paris.
HOBART (TASMANIA)	-	Walch & Sons	-	Merchants.
HONG KONG	-	C. J. Gaupp & Co.	-	Booksellers.
"	-	Messrs. G. Falconer & Co.	-	
MALTA	-	Collector of Customs	-	Custom House.
MARSEILLES	-	A. Rabier	-	4, Quai de Rive Neuve.
MELBOURNE	-	J. Donne & Son	-	346, Little Collins Street.
MONTREAL	-	Hearn & Harrison	-	1640-1642, Notre Dame Street.
NEWCASTLE (N.S.W.)	-	R. C. Knaggs & Co.	-	46 & 48, Hunter Street.
NEW YORK	-	John Bliss & Co.	-	128, Front Street.
PARIS	-	Galignani Library	-	224, Rue de Rivoli.
"	-	Augustin Challamel	-	17, Rue Jacob.
PORT ADELAIDE	-	A. E. Sawtell	-	Divett Street.
PORT ELIZABETH	-	J. C. Juta & Co.	-	Booksellers.
PORT NATAL	-	Lewis J. Wilson	-	The Point.
PORT SAID	-	G. D. Moulet & Co.	-	Shipping Agents.
"	-	The Anglo-American Book-selling Depôt.	-	Shipping Agents.
QUEBEC	-	T. J. Moore & Co.	-	118 & 120, Mountain Hill.
SAINT JOHN (NEW BRUNSWICK).	-	A. B. Smalley	-	91, Prince William Street.
SHANGHAI	-	Lane, Crawford & Co.	-	Merchants.
"	-	Hirsbrunner & Co.	-	1, Nankin Road.
SINGAPORE	-	Hon. Sec. and Treasurer	-	Sailors' Home.
SYDNEY (N.S.W.)	-	Turner & Henderson	-	16 & 18, Hunter Street.
TOKYO	-	Takata & Co.	-	Merchants.
TORONTO	-	Charles Potter	-	31, King Street.
VANCOUVER CITY	-	Thomson Stationery Company, Limited.	-	108, Cordova Street.
VANCOUVER ISLAND	-	Hibben & Co.	-	66, Government Street, Victoria.



